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Two million dollars is the Pennsylvania Railroad's estimate of what it will lose by reason of the very unusual snowstorm in New Jersey which was reported in the *Railway Age Gazette* of March 6. The larger part of this sum evidently represents loss of traffic; but the repair of the actual physical damage was very costly and the account of this work, given on another page, is a thrilling story. Many railroad men will find in it pictures of their own past experiences. It is not often, however, that such a multitude of trying experiences is crowded into two days. Eight or nine hundred shovelers for every ten miles of road is "some force"; and the task of gathering, feeding and safeguarding the thousands of workmen brought to the New York division from other parts of the company's system, would of itself make a stirring narrative. Our account is necessarily condensed, severely. Not the least interesting part of the leaflet issued by the company is that made up of letters from passengers whose troubles were alleviated by energetic and thoughtful station men and trainmen. It appears that falling telegraph poles blocked all of the tracks at only a very few places; and that the worst difficulty was the heavy and drifting snow. Trains were delayed by slight accidents, or by waiting for orders because of failure of the telegraph, sufficiently to give time for the snow to accumulate, in a way that it could not have accumulated if trains had passed over the tracks frequently, as they do under normal conditions. This, again, will recall to veteran railroaders some of their own experiences. By the expenditure of a million dollars for underground wires, throughout the 90 miles of the New York division, the company proposes to forestall such failures of the telegraph in the future.

Heroic Railroading in New Jersey

Is there no happy medium between the harshness of suspensions and the apparently excessive leniency of Brown's discipline? A correspondent asks this question in discussing our note of March 20, page 665, concerning the good and bad features of suspensions. As we said at that time, punishment is legitimate. Everybody admits this to himself. A clerk having to work an hour extra at night because he has done a job carelessly, is likely to admit that that hour's punishment is a better incentive to improvement than a mere reprimand would be. A mistake that costs five dollars, actual money out of pocket, is in most cases remembered much more vividly than a similar mistake that involves no financial loss. Fines would be legitimate as punishment for mistakes made by conductors, enginemen and brakemen; but any attempt to provide, in this way, a "medium" course encounters obstacles. The brotherhoods would not put up with such a system. Putting the fines into a benevolent fund does not seem to remove the objections to them, which prevail everywhere. There would be difficulty in fixing different sizes for different offenses; and there would be the feeling that the fine settled the damage, in spite of the fact that an error in train operation often costs ten times more money than the culpable employee could pay in a year. Therefore, although we may say that punishment is right, in theory, we shall still have in practice all the well-known objections which have led to the widespread abolition of suspensions. Those who object to "soft" tactics on the part of superintendents should remember that a velvet glove may encase an iron hand. And this maxim, taken in its best sense, may well be the watchword of the superintendent who aims to answer both classes of critics. That is to say, he must be *both* firm and considerate.

Fines Not Wrong in Principle

Discipline without suspensions continues to be a live subject, and not alone for those theorists who deal mainly in words. In the realm of fact the reader will be interested in a recent report from the New York Central, where suspensions were suspended, except for second offenses, two years ago (January 1912). The number of suspensions entered on the books in 1913 turned out to be 30 per cent. less than the number entered in 1912. In only a small percentage of these cases were the men required actually to lie off. The rule is that a suspension will be entered, but will not be enforced unless the employee comes up again for censure within the calendar year. If a man reaches December 31 with only one "record" against him he has the slate wiped clean. This rule was at first adopted only tentatively; but it has now been made permanent. Not only do the division officers uniformly testify to good results; the lessening of the number of cases by such a large number in one year is taken as evidence that the rank and file appreciate the benefits

Few Suspensions on the New York Central

of a more rational and humane system. In the style and substance of records, the New York Central plan is the same, in principle, as that of the Baltimore & Ohio, described in the *Railway Age Gazette* of January 16, last. The general manager requires of the superintendents that they, personally, weigh carefully each individual case, keeping constantly in mind three cardinal principles: the safety of lives (both of passengers and employees), the interest of the employee (to whom a 30-day suspension may mean severe financial distress), and true economy and efficiency in operation. The superintendent who adheres to this rule makes very few mistakes; he may hope to make none at all of a serious nature.

Safety of Coal Mines and Railways

A report just issued by the United States Bureau of Mines affords a basis for comparing the relative safety of coal mining operations and railway operations in the United States. The report shows that in the year 1913 the number of employees killed in coal mines was 2,785. The number of railway employees greatly exceeds the number of employees of coal mines, and yet in the year ending June 30, 1913, the number of railway employees killed was only 3,715. The fatality rate in the coal mines was 3.82 for every 1,000 men employed. It is not possible to give the exact fatality rate of railway employees, for we know only the number of them in the year ended June 30, 1913, on railways earning $100,000 gross or more. The number of employees of railways earning this much, however, was 1,699,218; and using this figure as a basis we get a fatality rate for railway employees of a little less than 2.2 for every 1,000 employees. If complete figures were available they would show that the fatality rate for railway employees is really less than this. In other words, in spite of the constant agitation regarding railway accidents, the fatality rate of railway employees is over 40 per cent. less than the fatality rate of employees of coal mines. Furthermore, the fatality rate in coal mines in 1913 was not exceptional, for during the last four years it was 3.68, and during the preceding four years it was 3.97. The railways of the United States are constantly criticized for their accident record, and there is no denying that it is bad. But as the *Railway Age Gazette* repeatedly has pointed out, the carelessness and recklessness which cause accidents in this country are a national disease which is not confined to the railways, but afflicts all industries and all classes. Every rational comparison between accidents on our railways and accidents in our other industries yields evidence supporting this view and indicating that bad as our railway accident situation it is better than the accident situation in almost any other line of industry with which railways can rationally be compared.

GOVERNMENT CONSTRUCTION IN ALASKA

THE bill for government construction of railroads in Alaska has finally been passed by Congress and signed by the President. The federal government will now have a chance to show what it can do as a builder and manager of railways. The advocates of this legislation contended it was necessary because private companies would not build in Alaska. This contention was buncombe. Private companies already had built a considerable railway mileage in the territory. The construction of railways by private enterprise was stopped by the withdrawal by the government of a large part of the country from development. There was nothing to be gained by building railways if the government, in pursuance of its conservation policy, was going to prevent the development of the country and thereby prevent the development of traffic for railways to haul. The conservation policy adopted may or may not be justifiable; but to say, after the action of the government had put a stop to railway development, that railway development had ceased because of lack of private enterprise, was absurd.

If the government continues with the Alaskan railway project as it has begun, the results will not furnish arguments for the extension of the policy of government ownership. The legislation was adopted after an investigation and report that were wonders in their way. The commission which made them was appointed by President Taft at the end of August, 1912. The report was rendered on January 31, 1913; and it purported to set forth the various routes, the probable cost of construction, the amount of traffic that the proposed railways would have, the rates they could charge, and what their gross earnings, operating expenses and net earnings would be. The world must needs take off its hat to a commission which could make an investigation and a report such as this during the rigors of an Alaskan fall and winter! And it is on the strength of such an investigation and such a report that Congress and the President have decided to spend $35,000,000 of the dear public's money.

If the commission's and Congress' guesses as to the costs of construction and other matters prove to be anywhere near correct, this will not be due to the investigation of the commission or to the wisdom of Congress, but to a miraculous intervention of Providence. Of course, if the expenditures greatly exceed the estimates the explanation will be made that many things developed which could not have been foreseen. This is the explanation always used when government projects do not turn out well; and the public has an extraordinary tendency to accept it *ad infinitum*. It will not be strange if there are many unforeseen developments, since the government has made almost no effort to foresee what the developments are likely to be.

IMPORTANT DEVELOPMENT IN COAL LOADING DOCKS

AN increase of about 20 per cent. in the tonnage of American railways furnished by the products of mines during the last five years has required the provision of elaborate terminals of special designs to handle the various classes of this low grade traffic. Among the more recent developments in facilities of this kind which have been mentioned in these columns are the ore loading docks of the Duluth & Iron Range, the Great Northern, and the Duluth, Missabe & Northern at upper lake ports, the ore unloading plant of the Pennsylvania at Cleveland, and the coal unloading plant of the Canadian Pacific at Fort William. All of these structures are located at ports on the Great Lakes; and, indeed, up to the time of completion of the Virginian dock at Norfolk in 1910, the mechanical facilities at Atlantic seaboard terminals were inferior to those on the Great Lakes. Only six coal unloading plants classed as mechanical were in operation in Atlantic ports, all of these being in New York harbor. One of the six was a belt conveyor outfit, hoisting the coal from a track hopper to a height sufficient to allow it to be dumped into boats. The other five were all car dumping machines located at a proper height to dump directly into boats, the road cars being pulled up in most cases by a barney. The remaining 50 docks located at the four Atlantic ports which load bituminous coal on ocean going vessels were of the gravity type, the road cars being pushed or pulled to the top of a trestle on the pier from which the coal is dumped into boats.

In spite of the fact that more coal from the West Virginia fields is hauled to the northwest since the acquisition of the Hocking Valley by the Chesapeake & Ohio, and in the face of increased competition for the West Virginia seaboard coal traffic which followed the completion of the Virginian and the Carolina, Clinchfield & Ohio, the Norfolk & Western has more than doubled its traffic in bituminous coal during the last five years, and the tonnage delivered to vessels at this company's terminal at Lambert's Point in the Norfolk harbor during 1913 was more than 46 per cent. of the total tonnage handled in this harbor. This heavy traffic made advisable the construction of a new loading dock which is described elsewhere in this issue. The new pier is not as long as several of those already in service in the New York harbor but it has a larger number of spouts than any of the gravity or simple mechanical piers and the same number as the combination dock of the Virginian. It is 22.3 feet higher than the Viginian pier, and 21.1 feet higher than its

companion gravity pier No. 3 at Lambert's Point, which formerly had the maximum capacity and the greatest height on the seaboard. The self-propelled pier cars are similar to those used on the Virginian docks, and have some common features with those used on the Canadian Pacific unloading dock at Fort William, but are of much greater capacity than either of the other designs.

By the replacing of one of the old gravity docks with this new combination mechanical gravity plant, the total rated capacity of the Norfolk & Western terminal was increased from 3,150 tons per hour to 7,875 tons per hour. The maximum capacity of a coal loading dock must be greatly in excess of the average output on account of the necessity for loading large cargoes rapidly in order not to delay the vessels unduly. In general, the output of the coal piers on the Atlantic coast averages about 30 per cent of their maximum capacities, but the new pier at Norfolk could have loaded all the coal shipped from Lambert's Point in 1913 by working at its maximum rated capacity for only 13 hours per week. While the rating of 90 tons per minute for this pier is unusually high, it has been shown during the three months that the new pier has been in operation that it is not only capable of developing this capacity, but it has actually exceeded the rate for one dumper already, and probably will considerably exceed the total rate when both dumpers are put in service.

THE RATE OF DEPRECIATION

TWO recent events foreshadow a revival of interest in the question of charges for depreciation. One is the Supreme Court's decision in the Kansas City Southern abandonment of property case, and the other the Interstate Commerce Commission's condemnation of the Chicago, Milwaukee & St. Paul's charge of 1 per cent on its equipment and the possibly significant mention by the commission of a charge of 3 per cent.

When the Interstate Commerce Commission's accounting rules were first put into effect in 1907 no phase of these rules was more widely discussed than the question of a charge to operating expenses for depreciation of equipment. The commission permitted the railroads to charge depreciation at any rate which they considered proper. This allowed a strong road to make a liberal charge for depreciation and a weak one to figure on equipment lasting 100 years if it so desired. As a matter of fact, there were comparatively few railroad managements which based the rate at which they charged depreciation on the estimates of the actual life of the equipment. This seems a rather startling statement and, of course, the estimated life of the equipment was taken into consideration; but the governing factor in determining what rate of depreciation should be charged was probably, consciously or unconsciously, the amount that the company could afford. A very large number of the poorer roads have been charging 2 per cent or less, and certainly no past experience has justified the belief that locomotives or passenger cars will be kept in service 50 years.

One of the reasons why so many railroad managements did not take the commission's requirements in regard to a charge for depreciation more seriously was because they did not believe in the principle. William Mahl, of the Southern Pacific, expressed the feeling of a great many practical railroad executives when he argued that if a car or locomotive were kept in perfect repair it did not depreciate. This is somewhat analogous to arguing that an arrow shot from a bow stands still because at any given moment the arrow is at a certain point —Achilles will never overtake the tortoise, even so, however, wearing out and obsolescence are not the same thing. It is readily acknowledged that all classes of railroad equipment become obsolete, and the reason back of the objection to charging a fixed rate of depreciation to cover obsolescence was that this obsolescence was part of the cost of progress, as W. H. Williams calls it.

It will be recalled that the argument of the railroad in the Kansas City Southern case was that it should not be compelled to charge the original cost of a line which it abandoned to operating expenses because this was really the cost of progress and therefore should remain as a charge to property account. The Supreme Court ruled squarely in favor of the Interstate Commerce Commission, although at the same time acknowledging that there was weight to a second argument made by the railroad company that the charge should be made to profit and loss rather than to the expenses of a specific year.

In its latest tentative classification of operating expenses the commission has provided for a charge for depreciation of all the materials in roadway and track, in addition to depreciation for equipment. If the commission should now prescribe a uniform rate of depreciation on equipment, say 3 per cent, it would appear, in the light of the Supreme Court's decision in the Kansas City Southern case, that the roads would have small chance to have such a ruling set aside by the courts. Such ruling as this would very materially increase the operating expenses of a good many of the weaker roads that could least afford to have their expenses increased, but it would, on the other hand, bring home to investors, and possibly even to the Interstate Commerce Commission itself, more clearly the needs of the roads in the way of net earnings. If there had been a ruling of the commission necessitating the Baltimore & Ohio's charging 1 per cent more for depreciation of equipment than it did in 1913, this would have increased operating expenses and therefore decreased final net by approximately $1,000,000. In 1913 this would have meant almost wiping out the surplus which the company had to put into its property after the payment of dividends. Of course, as a matter of fact, the Baltimore & Ohio may be making as high a charge already for depreciation as the commission will require; but the illustration is used simply to show what would be the effect if a road were charging but 2 per cent and the commission should order a rate of 3 per cent, or if a road were charging 3 per cent and the commission should order a charge of 4 per cent.

The American practice of not only maintaining but of bettering property out of earnings in prosperous years and tiding over lean years by living on the accumulated fat of previous years is so deeply ingrained in most American railroad managers that they are only now beginning to realize that a different policy will have to be pursued when they have got not only to justify themselves to their stockholders, but explain the whys and wherefores to the Interstate Commerce Commission and the public at large. Despite the hardships that it may work on a good many roads for a time, an ample charge for depreciation is not only theoretically right, but, under present circumstances, the soundest provision that can be made to safeguard the future unless indeed the commission were to rule that all new equipment must be paid for out of earnings.

AN IOWA VIEW OF THORNE AND OTHERS

PEOPLE living outside of Iowa have learned to look upon that state as the domicile of radicalism. It has succeeded Kansas as the part of the country in which new methods for dehorning the money power are expected to originate. There has grown up a natural tendency to assume that Senators Cummins and Kenyon, and last, as well as least, Clifford Thorne, represent the practically unanimous sentiment of that commonwealth. It would appear, however, from a letter which Mayor A. P. Brown of Fort Madison recently wrote on behalf of the city council of that place to the Greater Des Moines Association, that there are still communities in Iowa where there obtains the old-fashioned notion that invested capital is entitled to some toleration and that there is apt to be some relationship between the amount of toleration shown it and the amount of it invested. This letter of Mayor Brown's seems such an extraordinary document to have been written by one occupying an official position in Iowa, that we venture to tell the circumstances under which it was written and to quote from it at some length.

The work of slaying the money devil has been done with such effect in Iowa that the growth of the state's industries has

been retarded, while its farmers have been flocking to Canada and elsewhere. In consequence there was an actual decrease in the population in Iowa between 1900 and 1910. The Greater Des Moines Association has been casting about for means of stopping this process of depopulation. As one means, it addressed a letter to the board of aldermen of a number of cities asking them to adopt resolutions demanding that the state railroad commission prohibit the railroads from making low homeseekers' rates out of Iowa. Among the boards of aldermen to which this letter was sent was that of Fort Madison. The board designated Mayor Brown to make a reply. The mayor prepared one, and after hearing it read the board unanimously approved it and directed it to be sent. After the mayor has got well under way, he proceeds as follows:

"In our judgment it is not the homeseeker's rates that are taking the people out of Iowa and causing our state actually to decrease in population in the face of the general increase in population of the country at large. These rates provide for a round trip, bringing the people back as well as taking them out, and putting blinders on farmers will not prevent their seeing things that are wrong in Iowa or seeing things that are right in Canada."

Having told what is not the matter with Iowa, the mayor proceeds to tell what the matter is. He says:

"Iowa has been injured by ill-advised agitation against all forms of business and manufacturing and against the common carriers, which are the arteries of business and whose prosperity, as has recently been said by President Wilson, 'is intimately related to the prosperity of all forms of business and of the country as a whole.' This agitation has resulted in curtailing the efficiency of the transportation lines and preventing their expansion, and thus deprived our industries of adequate transportation facilities so necessary to their growth. Think of it! Not a mile of railroad being built in the great state of Iowa where thousands are in need of additional transportation. The main trunk lines of this state have been forced to a policy of retrenchment that will soon prove ruinous, and all of the minor railroads have been unable to pay operating expenses and have been forced into the hands of receivers."

After mentioning some of the roads that have been forced into receivership, the mayor continues:

"Some years ago our railroads granted a reduction in the Iowa tariffs on live stock to packing houses within the state, thus helping our farmers and local industries. This was helpful to the whole state if it had stopped there, but within the year some so-called reformers backed by certain commercial bodies, asked for a like reduction in live stock rates to Chicago, and forced the railroads to grant them, and the rates were made so low as to more than compete with the already low rates to Ottumwa, Cedar Rapids, Des Moines, Marshalltown and Fort Madison, thus helping the Chicago packing houses to the disadvantage of our own packing houses in the towns above named. And such achievements are pointed to with pride by our commerce experts. One railroad commissioner in his campaign literature, for example, calls attention to this wonderful achievement and succeeds in fooling the people, making them believe that he has benefited them, when, in fact, he has injured them all he possibly can."

Can the reader who is familiar with railway regulation in Iowa guess to which member of the state railroad commission Mayor Brown refers? If he cannot, the next few sentences in the mayor's letter will enable him to do so:

"Now we find the same gentleman chasing up and down the country advocating all kinds of socialistic ideas, such as government ownership of railroads, and showing all kinds of statistics and compilations of figures. God knows where he gets them! Certainly not from anything that has ever transpired on earth. For neither his figures nor his talk represents the true conditions either in this country or foreign countries where government ownership has been tried and has invariably been proven a failure and a heavy tax on the people."

No one after reading that can doubt to whom the mayor is referring. It must be to our old friend Clifford Thorne, the greatest compiler of statistics that do not represent anything that has ever transpired on earth that the earth ever saw. Continuing Mayor Brown pays his respects to the full crew and other legislation similarly affecting railways which, he says, has been "backed by the same reformers in order to gain the votes of the unthinking," and he concludes as follows:

"The legislature could take millions of dollars of the taxpayers' money and waste it on capitol extension grounds, but we are too poor to pay a fair price for the competent services rendered by the railroads and other public utilities. Relegate to the rear the wild-eyed, hare-brained demagogue that is trying to bust the trusts and smash all the railroads. What Iowa needs is the reputation of fairness to the manufacturer and the railroad owner. Then the farmer will have a home market for his stuff and it will not be necessary to put blinders on him to keep him from running away."

Plainly, there are some folks in Iowa who don't believe that pounding the railways over the head all the time is the best way to build up the industries of the commonwealth and stop the decrease in its population!

NEW BOOKS

Proceedings of the Twenty-fifth Annual Convention of the National Association of Railway Commissioners. Published by the Law Reporting Company, 115 Broadway, New York. Bound in black cloth, 612 pages. Price $1.

Heretofore the proceedings of this convention have been printed at the expense of the Interstate Commerce Commission, but since Congress has cut down on the appropriation for printing for the I. C. C., the Law Reporting Company has undertaken to print the proceedings and sell them at a price to cover the cost of the work. The proceedings, of course, do not include all committee reports and the discussion thereon. While there is a great deal of this matter that is of comparatively little value to railroad men, on the other hand there is some of it that is of a good deal of value and more of it which is interesting because of throwing light on the attitude of particular commissioners.

Proceedings of the American Electric Railway Association for 1913. Size 6 in. x 9 in., 673 pages, illustrated. Published by the association at 29 West Thirty-ninth street, New York City. Price $3.50.

The proceedings of the eleventh annual convention of the American Electric Railway Engineering Association, held in Atlantic City, October 13-17, 1913, are presented in a large and well illustrated volume. The minutes of each day's session with committee reports and discussions and lists of officers and the personnel of committees are included in the contents.

This association has also published its first year book covering the year 1913-14. It contains 318 pages and is bound in the same style as the proceedings.

Tests of Metals at Watertown Arsenal. 144 pages. 5¾ in. by 9 in. Illustrated. Published by the Government Printing Office, Washington, D. C. Bound in cloth.

This book is a report of the tests of metals and other materials made with the United States testing machine at Watertown Arsenal, Massachusetts, during the fiscal year ended June 30, 1913. It contains a great deal of valuable information, considerable of which is arranged in tabular form while a number of diagrams are included. Microphotographs of different metals are included in the illustrations and the half-tone work throughout is exceptionally good.

Electric Car Maintenance. By Walter Jackson, associate editor, *Electric Railway Journal.* 270 pages. 6 in. by 9 in. Illustrated. Bound in cloth. Published by the McGraw-Hill Book Company, Inc., 239 West 39th street, New York. Price $3.

The contents of this book have been selected from the columns of the *Electric Railway Journal,* except that some braking and wiring diagrams were added in order to secure a more extensive series of shop instruction prints. The work places in a convenient form a great deal of useful data which hitherto had been lost to most shop men within a few months after the original publication in periodical form. As a rule the methods described are such as require no costly apparatus and of a kind that can be applied to a great many situations. Among the subjects considered are mechanical appliances for train operation, the non-electrical parts of the car body, brake equipment, trucks, wheels and axles, car washing and painting, sanders and sanding devices, lubrication, bearing practice, current collecting devices, motors and gearings, control, circuit-breakers, controllers and resistances, heaters, lighting, signs and signals. The book is well printed and completely illustrated.

Letters to the Editor

EFFICIENCY VS. ENGINE TONNAGE

ALTOONA, Pa., February 16, 1914.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The desire of the motive power people for a good showing in engine performance has been the cause on many roads of holding back empty cars waiting for a full train, when such cars could be despatched in trains that would permit of much better movement than is now obtained. The motive power people see economy in giving an engine the full rating and the transportation department sees economy in sending a light engine over the road and dead-heading the train crew home on half time. The light engine, if it exceeds forty-five miles per hour, will probably arrive at the terminal in such condition that it will have to spend more time in the house undergoing repairs than it has made up on the road. If, instead of sending this engine light over the road, lighter trains were despatched, there would be a material increase in car mileage, and the classification yards could be kept clearer of cars waiting to be despatched, and these trains would make in many cases as good time as a light engine would make if it kept within its speed regulations.

One railroad president, in speaking of a bill before the state legislature limiting trains to 50 cars, said that if his westward empty trains were limited to 50 cars, his eastward loaded coal trains could not haul more than 40 cars, if the power is equalized. Would it not be better to adjust the power to suit the loaded train, even if it resulted in a surplus of power on the empty westward train, rather than to decrease his revenue producing train for the sake of balancing the power on his non-revenue producing train?

Arthur Hale said, "The way to make cars is to move them." This applies to both loaded and empty cars, but when you move a loaded car you are not only making cars but you are making money.

J. M. FAIR.

"RIGHT BY DIRECTION" NOT WELL UNDERSTOOD

NORFOLK, Va., February 24, 1914.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I have read with interest the article in your issue of February 13, telling of the rule, in force on the New York, New Haven & Hartford, by which trains of the same class, on single track, run to meeting points each regardless of the other, neither having right by direction. There is no question but that this is the most natural and correct method of operation. To adopt such a rule would be a move in the direction of safety and simplicity. It does not go against the natural inclination of the train men, who are constantly educated by their practice in handling train orders, issued by the despatcher, making meeting points, in which orders the meeting place is absolutely fixed. We teach men on the road, running trains, that a train order meeting point must not be passed; while, under the plan of superiority by direction, we work directly opposite to this teaching. That is to say, the principle employed in the ordinary time tables is not entirely consistent with the principle employed, most of the time, by the train despatchers.

After long experience with matters of this kind, I find that superiority by direction is not well understood except by men who have grasped the idea through considerable experience and practice; and it is not in every case clearly understood, even by men of this class. The records of the Virginian Railway show that a large percentage of men examined for promotion have been under the impression that a time-table meeting point, when trains are of the same class, cannot be passed by either train; they take it to be the same as a train-order meet. This view is almost invariably taken by men of limited experience, and usually by telegraph operators.

For some reason, the first impression regarding superiority by direction seems to be that it refers to the side-tracking proposition alone; that it means nothing more than that the train of superior direction will hold the main track. Another misconception often found is the understanding, on the part of many men, that all sections of an inferior train may follow signals carried by the first section, and run against a train of superior direction, of the same class, to the meeting point.

B.

THE "UPLIFT" IN THE RAILROAD SERVICE: OBSERVATIONS OF A YARD MASTER

HARTFORD, Conn., February 28, 1914.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

Every now and then some one rises to express admiration for the idea of applying "military discipline" in the railroad service. I have no sympathy with this notion. The thought of drilling an employee into involuntary obedience is un-American. The result of any such course is to kill the initiative, ambition, interest and pride which characterize such a large percentage of railroad employees.

The *esprit de corps* is of prime importance. Who has not, at one time or another, seen a terminal or division which has been disorganized because of the acts or omissions of one official, and which, on the advent of another man, *using the same men,* is completely restored to proper conditions. And the new man holds those men, making use of the very same forces. This because he has used men, not soldiers.

Officers tell of the growing independence of action on the part of employees, amounting almost to insubordination. Conditions of this kind must be met, not with a spirit of antagonism, but with one of inquiry as to what prompts this attitude, and to find a channel through which these very forces may be made to flow to the material and financial benefit of both sides to the controversy.

Some years ago L. F. Loree, then fourth vice-president of the Pennsylvania Lines West, in an address before an association of Pennsylvania transportation officers, epitomized their method of establishing a high grade of service as follows:

First:—Hire a better class of men.

Second:—Discharge the vicious and incompetent.

Third:—Educate those kept.

It will do no harm to read that several times. It may take some time to bring about these conditions. Could not many railroads find profit in employing more officers? With leaders enough careful consideration might be given to bringing about conditions which would make it desirable for better men to seek employment. More officers are necessary to hold the good men; to know the whole force so intimately that the vicious and incompetent may be separated. If there were less haste in approving applications it would frequently be found wise to say "application not approved."

Mr. Loree's third point is of great importance. After the preliminary examination on rules there should follow a systematic plan to discover the line along which the employee will develop to the greatest usefulness. Certain industrial companies are paying for courses of instructions given to hundreds of employees by correspondence; and already the plan of the original Harriman lines is open to officers and employees of other lines at a nominal cost. Many roads do conduct regular written as well as oral examinations of the operating rules. These are highly productive of beneficial results in that they draw out valuable suggestions and make it possible for employees to express themselves by word of mouth when it would be difficult to write.

"First Aid" and "Safety First" movements have quickly caught the interest and co-operation of the majority. The opportunity for an employee to work shoulder to shoulder with his "boss" has broken down many a man's indifference to

operating results. Officers have found that there is a refreshing impetus and human feeling created in their own case in knowing more intimately their own men. They very soon pick out this man or that as "having more in them than they supposed." The officer is now more likely to recognize that the man who has pulled the throttle for years, or whom we see catch the rear end of a freight with an armful of bills in one hand and a lantern in the other, has ideas and facts from the school of experience which would be highly profitable if we but found a way to harness them up, to mutual advantage.

Railroad officers as well as captains, majors and colonels, could profit by reading the following passage from Buell's Life of John Paul Jones: "Every commanding officer should hold with his subordinates such relations as will make them constantly anxious to receive invitations to sit at his mess-table, and his bearing toward them should be such as to encourage them to express their opinions to him with freedom and to ask his views without reserve. . . . In one word, every commander should keep constantly before him the great truth, that to be well obeyed he must be perfectly esteemed."

E. T. H.

THE RETURN ON THE EASTERN ROADS' STOCK

NEW YORK, February 26, 1914.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

In a recent series of articles in *Moody's Magazine* ("The Case of the Railroads," by Thomas Gibson and Charles F. McElroy) various statistics were presented to prove that investors in railroad securities have not only gained a high rate of return on their investment, but have profited by a large increase in the market value of their holdings. The compilations are for fifteen large railroads, but they include only five in eastern territory. Since the present rate case involves the eastern roads alone it would seem more consistent if such a study were based upon roads in that territory only. Moreover, the comparison of stock prices in 1900 with those in 1912, upon which the principal conclusions of these writers were based,* does not seem to be a fair one, since every year following 1900 has shown an average price considerably higher than the one of that year. The great fall in values in 1913 as compared with 1912 should also be taken into account.

The accompanying table has been prepared to indicate the pertinence of these criticisms, and also to introduce the factor of the purchasing power of money—using for this purpose Gibson's index numbers.† The index number may be applied to the prices of stocks or bonds for exactly the same purpose that it is applied to the dollar itself, or to any kind of commodity, *i. e.*, to determine the value in terms of exchange power for a fixed aggregate of goods of all kinds; the resulting figure representing no actual amount, but merely a basis of comparison between different periods of time. In order to apply the index number to any particular commodity, such as an "average" share of stock, the purchasing power of the dollar must first be determined and then applied to the value of the stock as expressed in dollars.

In compiling this table all common stocks of eastern roads which are listed on the New York Stock Exchange have been included, excepting subsidiary roads such as the C. C. C. & St. L., Central of N. J., P. C. C. & St. L., and Long Island. (N. Y., O. & W. was subsidiary during the years 1906-13, but its inclusion does not affect the averages.) Reading is omitted for the reason that it is a holding company designed to operate coal properties as well as railroads. The profits of the D., L. & W. have also largely been due to its coal interests, and for that reason the purchasing power of the average share is given both to include and to exclude the prices shown for D., L. & W. stock.

The average dividend rate for all the roads for the whole period 1900-13 is as follows:

	Nominal (On par value)	Actual (On market value)
Including D. L. & W.....	5.32 per cent.	4.63 per cent.
Excluding D. L. & W.....	3.69 per cent.	4.15 per cent.

The nominal dividend of the D., L. & W. since 1904, including extra and stock dividends, has averaged 30 per cent. per annum—due almost entirely to its interest in the sale and transportation of anthracite coal.

Messrs. Gibson and McElroy stated as one of their conclusions in regard to the fifteen roads which they investigated, "That in all cases investors who bought in 1900 have received large annual interest on money invested, the only annual return below 6 per cent. being on Pennsylvania (5.7 per cent.) and New York Central (4.7 per cent.)." Although the figures set forth above for the eastern roads have been compiled on a slightly different basis from those referred to in the quotation, it would appear that they are more pertinent to the issue now before the Interstate Commerce Commission, and that the conclusion to be reached therefrom is very different from the one stated by these writers, that the railroads can put forward no claim for advanced freight rates. It is also the opinion of the writer that some of the other statements in the series of articles tend to misrepresent the accounting practices of the railroads, and their financial condition at the present time.

OWEN ELY.

MARKET VALUE OF TWELVE EASTERN RAILROAD STOCKS, 1900-1913, AND THE AVERAGE YEARLY VALUE PER SHARE EXPRESSED IN RELATIVE PURCHASING POWER OF COMMODITIES

	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913
Baltimore & Ohio	$73	$98	$104	$88	$89	$109	$116	$99	$94	$113	$110	$102	$107	$99
Chesapeake & Ohio	33	41	50	40	40	53	59	40	43	74	79	78	77	66
Delaware & Hudson	118	145	169	166	170	210	212	176	162	184	167	167	169	157
Delaware, Lackawanna & Western	182	223	254	253	305	417	499	450	460	608	555	538	564	413
Erie	19	35	37	33	32	45	41	28	25	31	27	33	35	26
Lehigh Valley	26	34	34	40	47	72	76	64	65	90	92	169	171	155
New York Central & Hudson River	135	157	158	134	129	152	141	112	108	134	117	108	114	100
New York, New Haven & Hartford	212	212	232	206	192	204	197	158	145	164	156	139	134	98
New York, Ontario & Western	25	32	32	27	34	52	51	38	37	49	44	42	36	30
Pennsylvania Railroad	136	149	159	134	126	140	135	123	121	139	131	124	122	115
Pere Marquette	28	64	78	83	78	92	53	31	31*	33†	33	15†	2†	2*
Wabash	10	19	30	25	20	21	23	13	14	22	20	12	7	4
Combined average	$83	$101	$111	$112	$105	$131	$134	$111	$109	$137	$128	$127	$128	$105
Purchasing power of a dollar‡	109	109	98	101	103	102	95	91	95	89	87	92	86	86
Purchasing power of average share	90	110	109	103	108	134	127	101	104	122	111	117	110	90
Do., excluding D. L & W	81	98	97	90	90	107	95	73	73	84	77	83	76	66

* No quotation recorded; value in preceding year taken. † Bid price.

‡ The purchasing power of the dollar was determined by taking the reciprocal of Gibson's Index Numbers (See "The Case of the Railroads," *Moody's Magazine*, November, 1913, page 215). The figure for 1913 was estimated from a comparison of Bradstreet's Index Numbers for 1912 and 1913.

* *Moody's Magazine*, October, page 164, and January, page 13.
† Idem, November, page 215.

LOCOMOTIVE CONSTRUCTION BY SOUTH MANCHURIAN RAILWAY.—The South Manchuria Railway will soon begin the construction of several locomotives in its important railway work shops at Shahokou. The material for these locomotives has been ordered from England, and the railway hopes that it will be able to complete at least six locomotives by July, each costing about $18,000, as compared with $23,000 for a certain locomotive of English manufacture and $21,000 for one of American manufacture. The company also expects that as the mechanics acquire greater skill in this line of work, they will be able to reduce the present cost considerably.

The Railways of the Argentine Republic*

The First of Two Articles Giving a Description of the Greatest Transportation System in South America

By F. Lavis
Consulting Engineer, New York

The railways of the Argentine Republic are of three gages 5 ft. 6 in., 4 ft. 8½ in., and meter (3 ft. 3⅜ in.) usually referred to as broad, medium and narrow, the mileage of each gage being as follows on December 31, 1912:

	Kilometers			
	Operated	Provisional	Total	Miles
Broad	19,164	740	19,904	12,340
Medium	2,518	131	2,649	1,642
Narrow	9,283	1,018	10,301	6,387
			32,854	20,369

As lengths of lines in this article are given in kilometers, the metric system being used exclusively in Argentina as in practically all of South and Central America, it may be well to keep

Earth Ballasted Track on the Argentine Government Lines

in mind that the kilometer is, roughly, six-tenths of a mile (0.6214). Tons are metric tons (2,204 lb.) equal, approximately, to our long tons.

The broad gage lines are located principally in the rich provinces of Buenos Aires, southern Cordoba and Santa Fe, reaching out by the lines of the Pacific to Mendoza, and there connecting with the Transandine (narrow gage) for Chili. The narrow-gage lines are principally in the north, though they reach to the city of Buenos Aires and tap parts of the southerly section. The medium-gage lines serve the provinces of the Entre Rios and Corrientes between the rivers Parana and Uruguay, and it is of interest to note that the railways of Paraguay and Uruguay, which adjoin these two provinces on the north and southeast, respectively, are also 4 ft. 8½ in. gage, Paraguay having about 400 kilometers (248.5 miles) and Uruguay about 3,000 kilometers (1864.2 miles).

OWNERSHIP

The railways are owned mostly by foreign corporations. There is one local company and the rest are owned and operated by the government, the distribution being as follows:

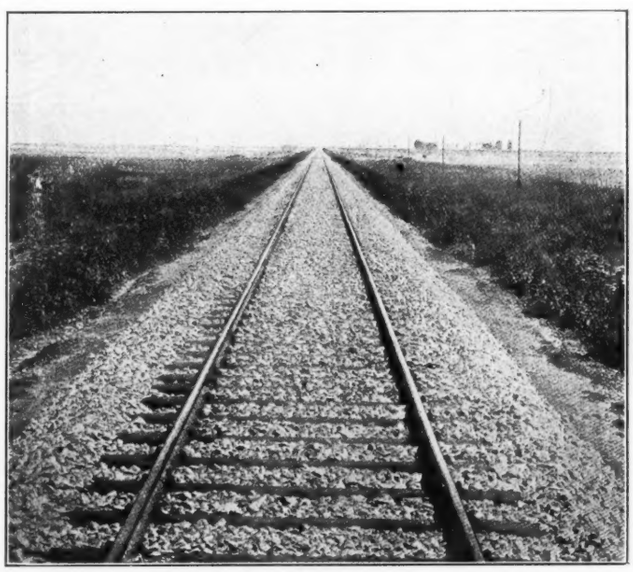
	Length	Capital invested
British	22,908 km.	$875,000,000
French	3,770 km.	112,000,000
Argentine	269 km.	9,000,000
Argentine government	5,907 km.	122,000,000
	32,854 km.	$1,118,000,000

Note.—Copyrighted by the Simmons-Boardman Publishing Company, March 27, 1914.

*The second part of Mr. Lavis' article will be published in an early issue.

Two of the lines included under British ownership, namely: the Entre Rios and the Central Cordoba with the Rosario á Puerto Belgrano (French) aggregating together some 3,900 km. (2423.5 miles) are now operated by the Argentine Railway Company, an American corporation in which certain English, French and Belgian banks are largely interested. The capital invested, of course, has not necessarily come wholly from the countries in which the companies are incorporated, but generally the larger part of it has.

As practically all the equipment and supplies, as well as fuel for the railways, is imported, this matter of ownership is especially interesting to manufacturers of railway supplies in the United States, as all these railroads naturally make a point of favoring, so far as is reasonably practicable, the manufacturers of their own countries. North American rolling stock is by no means unknown, and all our leading builders of both cars and locomotives are quite well represented, but, speaking generally, it can be said that orders are only placed in the United States when there is difficulty in placing them in Europe. Of course the principal officers and many of the employees in the more responsible positions are British with a natural inclination to favor the products of their own country, but the

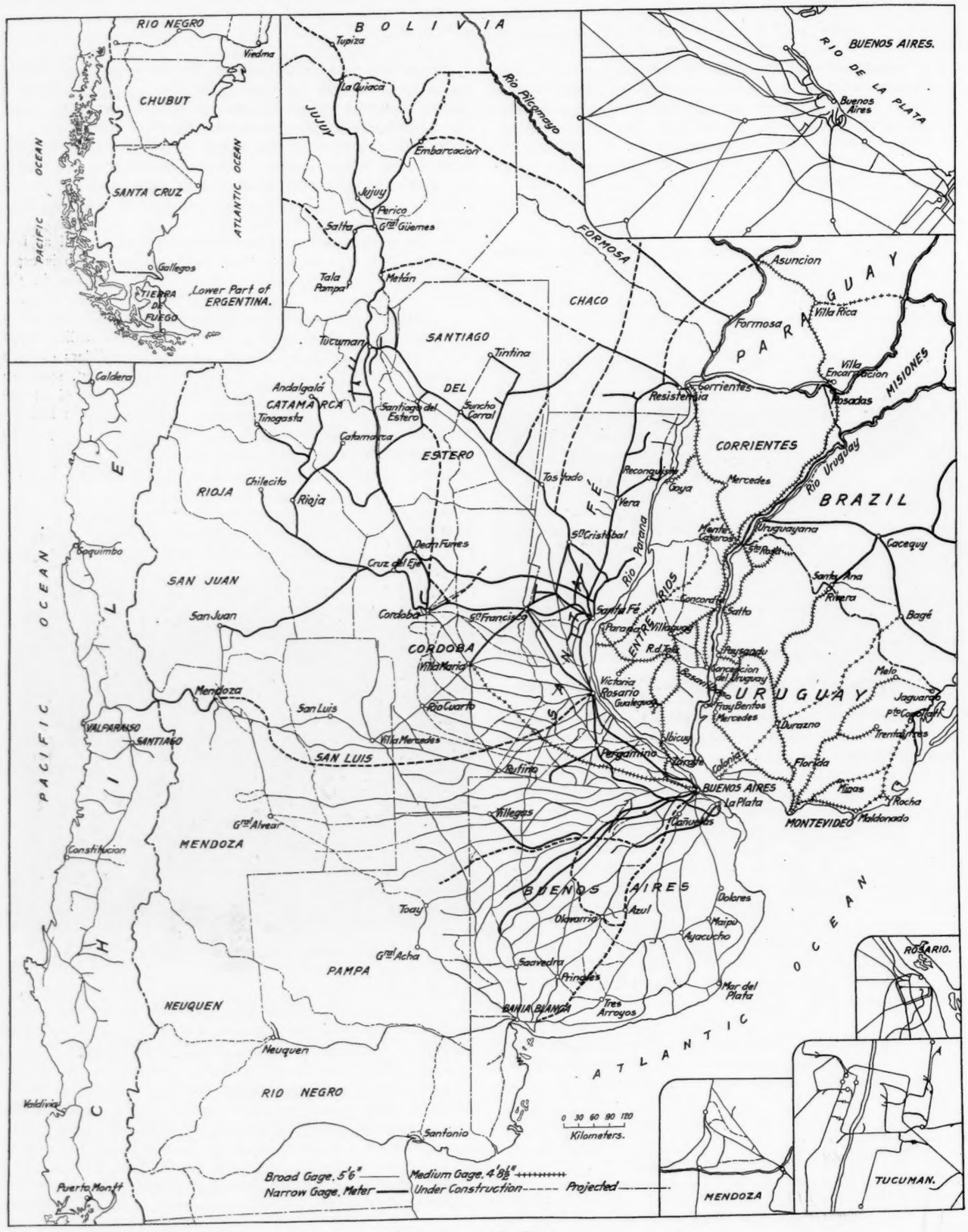


Modern Argentine Track—100 lb. Rails on Steel Ties

writer hardly believes they go quite so far as the author of a recently published book* on the Argentine which states: "An engine made at Hunslet in 1875 is still doing good work, whereas American engines go to the scrap heap in three years." After reading the above on the way down, by a strange coincidence one of the first engines the writer happened to see in service was a Baldwin engine with a date of the early seventies. There is one point, however, to which European manufacturers seem to pay more attention than do those in the United States, and that is in regard to the fuel economy of locomotives. This is much more important in Europe than it generally is in the United States, and of course, is very much more so in the Argentine

*"Argentina," by W. A. Hirst, page 270 (2).

than in either. The writer was not able to find anything in the shape of actual tests to support the claims made by some of the European master mechanics, that American locomotives were not as economical in the matter of fuel consumption as those built in Europe, and the matter is only mentioned in passing. Much of the rolling stock, both locomotives and cars, on the Entre Rios Railway, Central Cordoba Railway and the government lines is of American manufacture and, of course, doing good service. Given a fair field and no favor our manufacturers can compete in every respect with those of Europe, but



Argentina and Its Railways

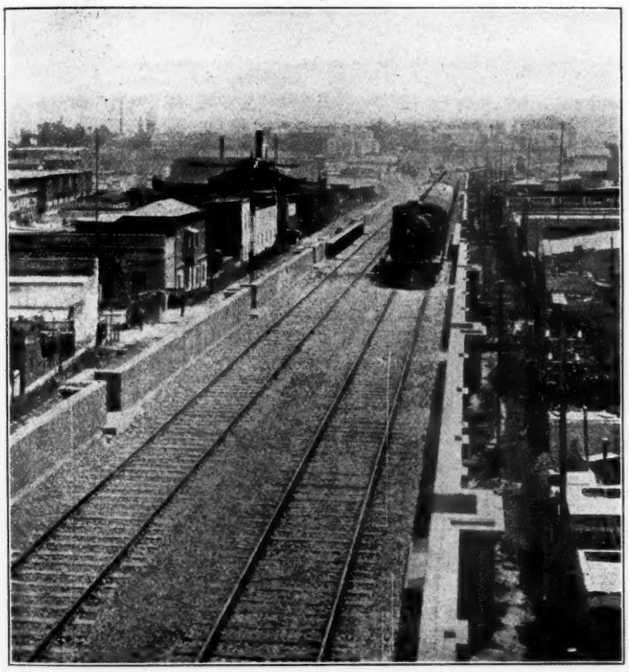
it is only natural that, all things being equal, or even where they are not quite so, the manufacturers of the countries supplying the railway capital should be favored. The officials in control of the government lines who are, of course, not handicapped by considerations of the source of supply of their capital, are rather inclined to favor the United States.

STATISTICS

The general progress of railway construction in the Argentine since 1855 is shown in the following table:

Year	Length, kilometers	Dollars, gold	
		Capital	Gross earnings
1360	39	741,000	98,320
1870	732	18,835,000	2,502,000
1880	2.516	62,964,000	6,560,000
1890	9,432	321.264,000	26,049,000
1900	16,563	530.820.000	41,401.000
1910	26,000	960,000,000	110,000,000

The figures for 1910 are approximate only. Progress has been quite steady and rapid since 1880, except for the setback for the two or three years following the panic of 1890.



Entrance of Buenos Ayres Great Southern into Buenos Ayres Since Widened to Four Tracks

The details of the mileage, earnings, etc., of each individual road are given in the following table. (Year ending December 31, 1912.)

	Length, kilometers	Capitalization	Earnings		Per Cent.
			Gross	Net	
Broad Gage—					
Southern	5,608	$220,503,600	$27,127,561	$11,311,439	5.12
Western	2,669	101,959,200	12,225,441	5,474,275	5.36
Pacific	5.342	216,086,900	24,405,713	9,185,113	4.25
Central Argentine	4.751	197,276.600	26,360,005	11,481,579	5.82
Rosario Puerto Belgrano	794	30,957,100	553,575	903,958	....
Total	19,164	$766,783,400	$90,672,295	$38,356,364	5.00
Medium Gage—					
Entre Rios	1,175	$30,391,700	$2,379,390	$908,096	2.98
North East Argentine	1,074	29,538,100	1,609,335	622,090	2.10
Central of Buenos Aires	269	8.942,800	977,091	305,389	3.41
Total	2,518	$68,872,600	$4,965,816	$1,835,575	2.68
Narrow Gage—					
Government Lines	4,018	$121,872,900	$6,292,069	$359,428	0.43
Central Cordoba	1,935	70,525,000	8,220,351	2,253,352	3.19
Santa Fe	1,709	42,131,700	5,787,433	2,085,278	4.95
Province of Buenos Aires	1,267	39,399,300	2,497,010	527,847	1.34
Transandine	185	8,902,800	676.605	125,299	1.76
Central del Chubut	86	1,255,200	177,326	83,989	6.69
Tranvia a Vapor de Rafaela	83	467,100	44,891	12,976	....
Total	9,283	$284,554,000	$23,695,685	$5,454,217	1.95

All figures throughout the article are in gold dollars, practically equivalent to United States currency. The statistics shown in Tables 1 to 4 are taken from the official report covering the year ending December 31, 1909, and the following comparison will indicate generally the growth of the railways since that time, which is being maintained in about the same ratio:

	1909	1912
Length of line in operation, km.	24,309	30,964
Capitalization	$899,262,374	$1,120,210,000
Gross receipts	104,365,027	119,333,796
Expenses	61,989,558	75,680,837
Net earnings	42,375,469	43,652,959

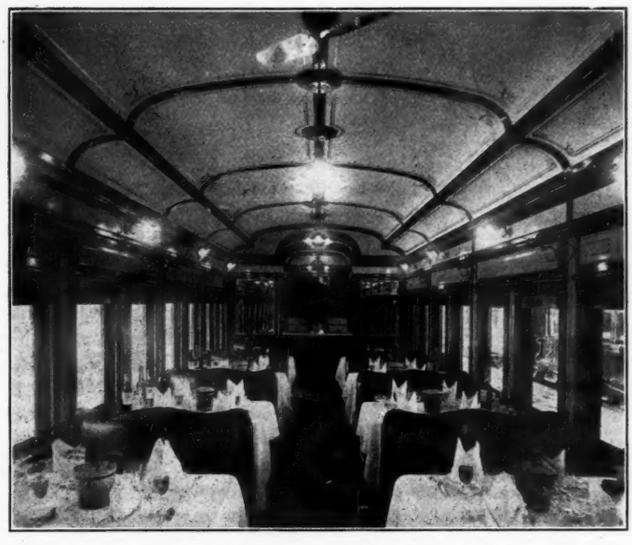
Table 1 shows the distribution of length of line in the various provinces, per 1,000 inhabitants and per 100 sq. km. (38.6 sq. miles).

TABLE 1

Provinces—	Length, km.	Km. per 100 sq. km.	Km. per 1,000 population
Buenos Aires	8,480.7	2.78	5.65
Santa Fe	4,078.5	3.09	5.48
Entre Rios	1,122.2	1.50	2.90
Corrientes	727.7	0.86	2.33
Cordoba	3,111.9	1.93	6.63
San Luis	749.4	1.01	7.33
Mendoza	840.3	0.57	5.74
San Juan	138.1	0.16	1.30
Catamarca	364.3	0.30	3.46
Santiago del Estero	1,305.8	1.27	6.83
La Rioja	514.1	0.57	6.08
Tucuman	713.5	3.09	2.58
Salta	380.7	0.24	2.72
Jujuy	466.1	0.95	8.14
Territories—			
Chaco	156.5	0.11	7.31
La Pampa	1,046.5	0.72	17.21
Chubut	85.8	0.04	7.81
Rio Negro	385.6	0.20	18.12
Neuquen	4.2	0.004	0.17

Table 2 shows some data in regard to rolling stock, Table 3, traffic statistics, and Table 4, the earnings and expenses per kilometer of line.

The Argentine lies practically wholly within the south temperate zone, and omitting the southern territories and Patagonia, between the same parallels of latitude south as the southern section of the United States between Baltimore and Florida does in the north, the climate being very similar. There is little hard frost at any time in any part of the section north of Bahia Blanca, except, of course, in the mountains in the extreme west.



Interior of Argentine Restaurant Car

TOPOGRAPHY AND CHARACTER OF CONSTRUCTION

The topography of the country, especially that part mostly developed by the railways up to the present time, is most favorable for their construction. Nearly the whole area from Bahia

Blanca, and even south of this to the northerly boundary and beyond, and from the Parana river to the main range of the Andes, is a vast plain almost level in parts, though mostly slightly rolling, in places considerably so, broken by few rivers of importance. The majority of the numerous streams starting from the mountains disappear from the surface before they have traversed the plain for any considerable distance, though the water may be found almost everywhere by comparatively shallow borings. The provinces and territories which touch the Chilian border are hilly and mountainous, Entre Rios and Corrientes hilly and rolling. Over 90 per cent. of the alinement of all the railways is tangent and 30 per cent. of the grades are level, and when it is considered that there are, approximately 2,000 km. (1,248 miles) of really mountain lines and 2,000 km. in Entre Rios and Corrientes, the favorable conditions under which the other lines have been built and are operated can easily be realized. The writer, however, had more than one occasion to recall, in riding over some of the lines in more or less rolling country, the late A. M. Wellington's statement that more mistakes in location are made in easy country than in mountainous, and it seemed sometimes as if better ultimate results might have been obtained if the curvature had been horizontal rather than vertical.

TABLE 2.—ARGENTINE RAILWAYS—ROLLING STOCK, DECEMBER 31, 1909

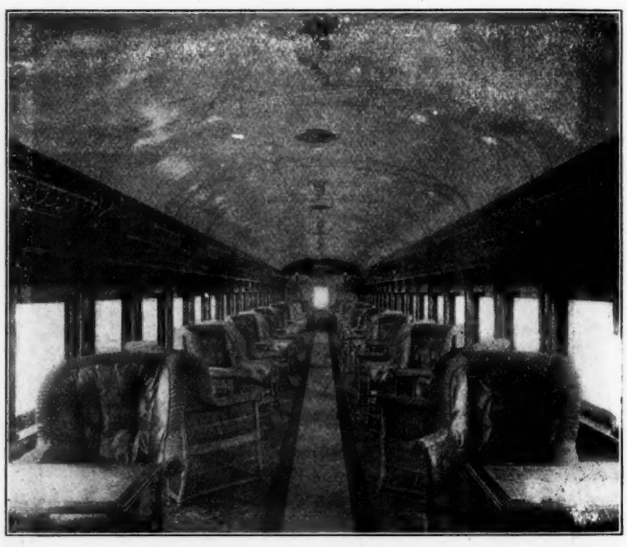
	Locomotives			Freight cars		
Broad gage—	No.	Av. weight with tender	Pass. cars, number of	Total No. of cars	No. of cars per km. line	Capacity in tons per km. line
Southern	546	81.3	578	12,330	27.9	583.8
Western	292	82.6	263	6,806	31.9	889.8
Pacific	646	92.6	338	10,748	28.8	661.5
Central Argentine	544	77.3	514	14,899	38.1	752.2
Medium gage—						
Entre Rios	51	68.3	47	983	10.0	249.6
North East Argentine	49	48.1	53	693	8.4	106.9
Central of Buenos Aires	32	36.6	20	719	27.7	201.3
Narrow gage—						
Government Lines	241	59.1	180	3,814	11.4	255.9
Central Cordoba	164	61.6	161	3,808	29.0	434.5
Santa Fe	121	48.8	126	4,021	23.0	332.2
Province of Buenos Aires	71	68.0	94	1,611	26.8	670.5
Transandine	23	43.9	20	184	10.5	101.4

TABLE 3.—ARGENTINE RAILWAYS—TRAFFIC STATISTICS, 1909

	Passengers			Freight			
Broad gage—	No. per km. of line	Aver. length of journey, km.	Receipts per Pass. km. Cents	Tons per km. of line	Ton km. per km. of line	Aver. haul, km.	Receipts per ton km. Cents
Southern	131,270	33	1.23	1,539	271,485	176	2.03
Western	113,431	35	1.22	1,579	331,435	210	2.34
Pacific	69,810	39	1.33	1,270	259,461	206	2.70
Cent. Argentine	140,075	39	1.23	1,772	366,421	207	2.26
Medium gage—							
Entre Rios	26,507	88	1.62	637	101,971	160	2.15
N. E. Argentine	17,140	102	2.12	324	75,808	234	3.03
Central of B. A.	183,963	170	0.40	1,176	199,948	170	1.81
Narrow gage—							
Gov't Lines	14,304	44	1.82	510	74,814	138	1.75
Central Cordoba	56,690	70	1.17	2,545	404,506	163	1.48
Santa Fe	20,109	46	2.07	1,068	243,492	228	2.45
Prov. of B. A.	27,228	49	1.31	1,263	231,153	183	1.62
Transandine	24,449	14	5.08	187	28,262	151	4.47
Average of all lines	82,494	39	1.23	1,279	249,622	195	2.24

The most important physical characteristics which affect railway construction and operation are the scarcity of stone or gravel, the high cost of fuel, and in some sections the lack of suitable water for the locomotives. Coal has to be imported from Europe, and costs the railroads from $10 to $12 per ton on the engines. Wood is used in some of the more northerly sections. Stone for ballast is found only near Tandil, about 400 km. (250 miles) south of Buenos Aires, near Bahia Blanca and west of Cordoba, Tucuman and Embarcacion. Considerable stone for building purposes and for ballast is brought from Uruguay to Buenos Aires.

Generally speaking, the railways are all maintained in good condition. Owing to the scarcity of wood and stone nearly all bridges are of steel, and brick is used quite generally for piers, abutments, culverts, etc., though concrete is coming into more general use. Cement is now practically all imported, mostly from Europe, but there is good hydraulic lime available, and undoubtedly before long cement will be made in the country. Of course the lack of fuel is the principal drawback. Comparatively few of the lines are ballasted, but throughout most of the country the black earth, which is placed over the tops of the ties and compacted and arranged so as to shed the water and prevent it reaching the ties, makes a good and very easy riding track. In the case of heavy continued rains, the water gets through to the ties, and then, of course, the track goes to pieces. The character of



Parlor Car, Central Argentine Railway

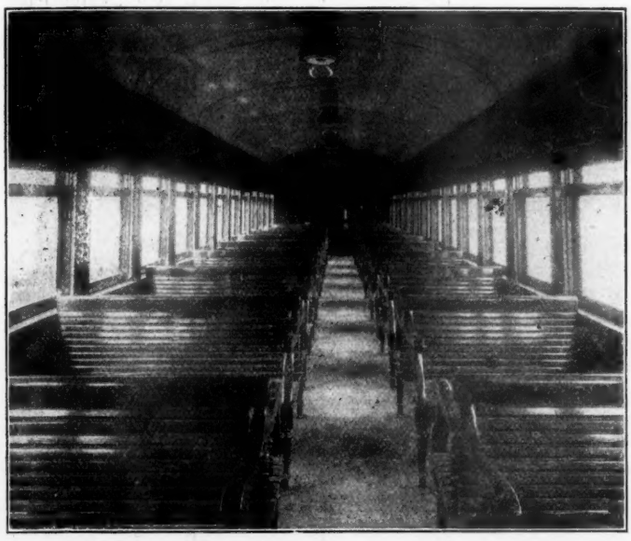
TABLE 4.—ARGENTINE RAILWAYS—RECEIPTS AND EXPENDITURES, 1909, PER KILOMETER OF LINE

	Receipts					Expenses					
Broad gage—	Passenger	Express	Freight	Miscellaneous	Total	Mtce. of way	Traction and movement	Traffic	Direction	Total	Net earnings
Southern	$1,620	$300	$3,126	$173	$5,219	$516	$1,398	$543	$281	$2,738	$2,481
Western	1,380	265	3,694	190	5,529	695	1,412	600	347	3,054	2,475
Pacific	871	129	3,504	70	4,574	350	1,714	466	314	2,844	1,730
Central Argentine	1,727	181	4,007	152	6,067	594	1,663	743	416	3,416	2,651
Medium gage—											
Entre Rios	430	46	1,371	42	1,889	246	419	179	143	987	902
North East Argentine	363	16	984	24	1,387	200	391	93	110	794	593
Central of Buenos Aires	727	90	2,124	76	3,017	345	931	567	173	2,017	1,000
Narrow gage—											
Government Lines	263	13	952	27	1,255	257	618	142	85	1,102	153
Central Cordoba	643	37	3,664	298	4,642	477	1,287	523	308	2,595	2,047
Santa Fe	416	48	2,618	36	3,118	560	867	370	226	2,023	1,095
Province of Buenos Aires	357	61	2,046	110	2,574	306	961	712	129	2,198	376
Transandine	1,242	43	837	52	2,174	559	1,521	157	102	2,339	*165
Average of all lines	$1,016	$144	$2,862	$117	$4,139	$458	$1,247	$467	$268	$2,440	$1,699

*Loss.

the earth varies also and it stands up under wet weather much better in some places than in others.

In connection with the construction one notices particularly the little use of machinery. Steam shovels, wheel or drag scrapers are almost unknown, and picks, shovels and wheelbarrows are used almost exclusively even for fills 15 and 20 feet high. It is claimed that many Americans have tried scrapers, etc., but always



Interior of Second Class Coach, Central Argentine Railway

unsuccessfully. The writer, however, is convinced that in view of the high price of labor there is no doubt that American methods could be utilized to advantage if properly applied. In this form of track construction the earth is rounded up over the ties to the level of the top of the rail, then at about every third tie, alternating first at one side and then on the other, a depression is made between two ties and under the rail so that the water can drain off to the side and there is no chance for it to continue along the track between the rails, and so start a gully. In "boxing" in the track, as this covering in process is called,

Cereals in Bags Stacked Up at Stations Awaiting Shipment

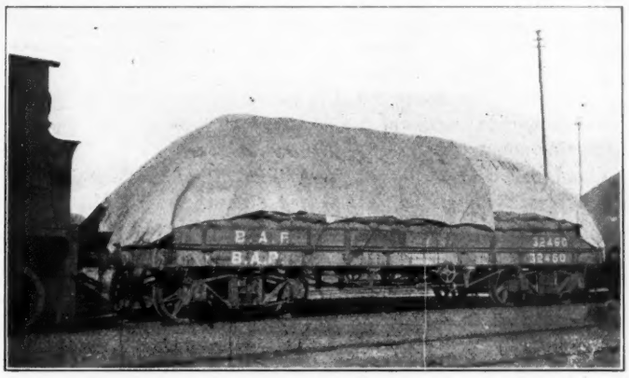
the surface of the earth is smoothed and compacted, so as to shed the water as much as possible.

Crossties are nearly all of quebracho, a very hard and durable wood found mostly in the forests north of Santa Fe. They have to be bored for spikes and have a life of from 10 to 25 years, varying with the traffic conditions and the quality of the wood. Rails are almost wholly of the American T or flange type. The English lines use the ordinary cut spikes (dog spikes), and the French and government lines screw spikes. One line uses screw spikes inside and cut spikes outside. Tie-plates, of course, are not used on account of the hardness of the wood. Steel ties of the trough type have been used to a considerable extent when the supply of quebracho has been inadequate to supply the demand, and while they have given good service they are usually not heavy enough for heavy traffic such as that of many lines in the United States. The government requires the use of native hardwoods unless special permission is given for the use of other material. Ties cost about $2 each for 5 ft. 6 in. gage, $1.60 for medium gage and $1.20 for narrow gage; rails about $30 at Buenos Aires.

There is altogether about 1,000 km. (621 miles) of double track. Most of the stations are equipped with home and distant signals at each end, block signals are used on lines of heavy traffic, and the staff system on some. Trains are all operated by the so-called "via libre" system, whereby the train receives an order at each station allowing it to proceed to the next. (This is modified for certain trains which do not stop.) The trains while standing at stations are under the control of the station agent, who gets his "via libre" (clear line) from the agent of the next station, gives the card to the conductor and despatches the train when he is ready.

EQUIPMENT AND SERVICE

The passenger equipment is mostly of the so-called "American" type, that is, open cars with seats on either side of the aisle. There are two classes, first and second. The sleeping cars are,



Method of Shipping Cereals in Bags on Flat Cars Protected by Tarpaulins

however, nearly all divided into compartments with the berths crossways of the car on the broad and medium gage, lengthwise and on one side only on the narrow gage. There are very few Pullman type sleepers. The compartments have two or four berths, upper and lower, and are comfortable to sleep in, but not to sit in during the day, so most of the passengers sit in the dining car, which is run as a buffet and bar between meals and usually does a good business.

To the writer it seems far preferable, if one cannot afford to pay for two berths (fare-and-a-half plus twice the berth rate) which is necessary in order to get a compartment alone, to have a berth in a car similar to our Pullman with 15 or 20 other passengers, than in a compartment with one stranger, but this does not appeal to the European, who refers to the inconvenience "of dressing in the passageway" of the Pullman; and he has firmly impressed his ideas on the Argentine. The idea of a lady traveling alone and undressing in a public coach is also, of course, unthinkable to most Europeans as well as the Latin Americans. One Englishman who has traveled to some extent in America complained also of the difficulty of getting his usual "night cap" before retiring for the night on the American trains. Under the new prohibition laws he would probably die of thirst if he came back now, but there is no difficulty in regard to this in the Argentine.

Meals in the diners are usually served on the table d'hote

plan and are generally quite satisfactory, costing about one dollar, gold. Owing to the use of dining cars as general lounging and bar rooms it is difficult to keep them clean, and in this respect the service is at times not altogether as attractive as we are accustomed to expect. On some of the lines where the service demands it, two cars are used for the restaurant service, one whole car being used as the diner; the other has the bar at one end next the diner with the kitchen occupying the rest of it. Owing to the rather high charges for excess baggage, the size of some of the "hand" baggage is rather large and takes up considerable room and often the seats in the day coaches.

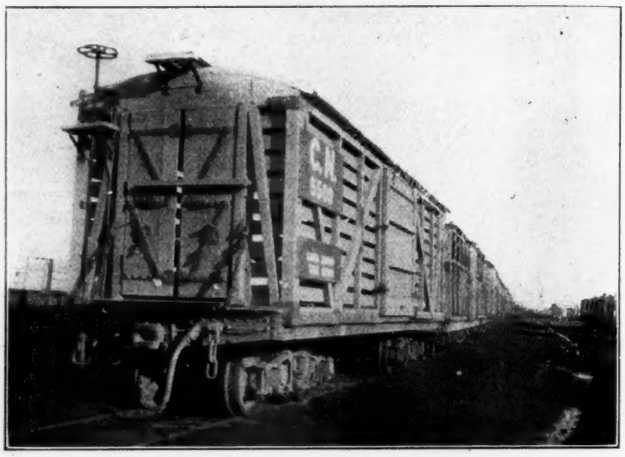
Tickets are good only on the day of issue, and while reservations for sleeping car accommodations can be made ahead, the tickets and berth checks cannot be bought until the day they are to be used. Passengers purchasing sleeping-car accommodations are usually required to give their names. Commutation tickets are issued in the Buenos Aires suburban zone for one, three, six, or twelve months, the rates for the longer periods being somewhat lower. They are of the card type, which only has to be shown. Monthly tickets are regularly issued only on the first of the month, but tickets can be bought at any time during the month by paying a proportionate rate for the remainder of the current month and for the whole of the succeeding month. A receipt is given for this latter amount to be exchanged for the ticket on the first of the month. Quarterly tickets are issued only on the first days of January, April, July and October, semi-annual tickets on the first days of January and July, and annual tickets only on January 1. Tickets for the previous month are accepted for the first three or four days of any new month or period. Commutation tickets are issued for both first and second class, and for wives of commuters at half price. On the Southern railway there are about 175 trains daily in each direction in the suburban zone, on the Western 60, and on the Central Argentine about 150.

The broad and medium gage rolling stock has side buffers and screw couplings as in England. The link and pin center coupling and buffer drawbar is quite generally used on the narrow gage, though on all the new passenger equipment of the government lines, which was built in the United States, M. C. B.

Quebracho Logs on Small 18-Ton Flat Cars; Santa Fe Railway

couplers are in use. A commission is studying the question of automatic couplers with a view to recommending a type for general use, the adoption of which is to be made compulsory. Owing to the light grades very little of the rolling stock has power brakes—many cars in fact have none at all. Most of the cars are of comparatively light construction, but the tendency to use heavier trains as the lines are combined into systems and the length of the haul increases, is compelling, as it has in the United States, the use of heavier underframes and draft rigging. On one section of steep gradients on the government lines a pusher is always used, irrespective of the weight of the train, to prevent accidents from the train breaking in two, which frequently happened when only one engine was used. Many of the older lines still use little 8 or 10 ton two-axle cars, though there are many modern cars of 100,000 lb. capacity on the broad gage lines. The practical limit on the narrow gage, and the maximum in the Argentine, is about 60,000 lb., except for heavy material which has a low center of gravity and of which there is very little to be hauled in the Argentine. Much of the grain is shipped in open cars, and tarpaulins and canvas covers are largely used, as in England. Cattle cars are usually of the end unloading type, which seems to the writer far better in that it affords much greater facility for loading and unloading than the side dump type.

Some very comfortable and a few fairly fast trains are run, though in regard to speed the Argentine is considerably behind



End Loading Cars on the Government Lines

this country and Europe. The Central Argentine runs a train of all Pullmans (chair cars) daily between Buenos Aires and Rosario, 180 miles, in 4 hours and 55 minutes. This, on account of the prominence given to the 4 hours with the 55 minutes in small type in the advertising is known as the Gath & Chaves, after a well-known Buenos Aires department store. During the summer the Southern railway runs a fast afternoon train, all Pullmans, to Mar del Plata, a fashionable seaside resort, 250 miles, in seven hours. Trains of 8 and 12 sleepers, leaving Buenos Aires at night and arriving in the morning are not at all uncommon. The runs for the through trains vary from about 300 to about 700 miles, and the average speed for the most important trains on the broad gage is about 25 to 30 miles per hour for the whole run. On the narrow gage it is, of course, much less. As noted further on, the medium (4 ft. 8½ in.) gage lines have heretofore been more or less neglected, but now, with the opening up of the through route from Buenos Aires to Paraguay, it is expected as soon as improvements in the permanent way are completed to be able to run through trains at speeds which will bring Asuncion within 36 hours of Buenos Aires, instead of 4 to 5 days as formerly (by river).

FREIGHT AND PASSENGER RATES

The fares for passenger service are usually on a straight mileage basis. On the principal broad gage lines about 4½ cents per mile for first class and two-thirds of that for second class. One hundred and ten pound of baggage are allowed free, and the excess rate is about 1½ cents per pound per 100 miles, though a sliding scale is used for this as for freight. Express matter is handled directly by the railroads; the tariff provides for four classes, the rates (not including delivery or collection) for 100 miles being about $1.50, $.75, $.60 and $.45 per 100 lb. A sliding scale is used for this also, the rate for 1,000 miles being approximately, three times as much as for 100 miles.

The freight tariffs have twelve basic classes, three classes of reduced tariffs, and one for cattle. They are arranged on a sliding scale according to distance. For 100 miles the rates vary

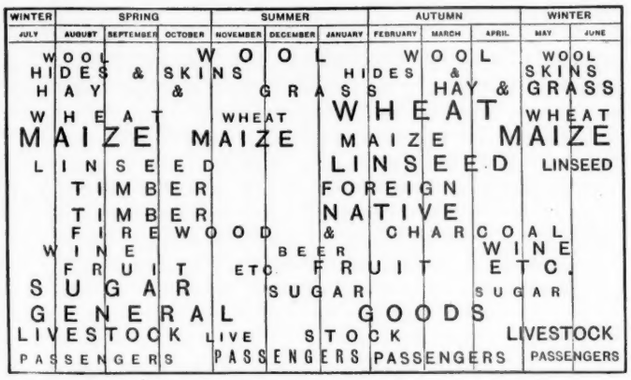
from $2.78 to $14.00 per ton (2,200 lb.), for 500 miles from $6.09 to $32.41 per ton for the same classes. Rates for cattle per car of 40,000 lb. capacity are about $33 for 100 miles and $72 for 500 miles.

SOURCES OF TRAFFIC

The Argentine has no manufactures of importance and its wealth is derived almost entirely from its pastoral and agricultural products. Wheat is cultivated mostly in the southern part of the province of Buenos Aires and in the vicinity of Bahia Blanca and exported largely from that port. Maize and linseed are the important crops further north and in Entre Rios. The principal refrigerating and packing plants are on the Rio de la Plata and river Parana between La Plata and Rosario. Quebracho comes from north of the city of Santa Fe, and nearly all the exports of it are from that port. A diagram is reproduced in one of the illustrations from the annual report of the Central Argentine Railway showing the distribution of the traffic.

With the great valorization of the lands in this section, due to its agricultural development, the cattle industry is being pushed towards the north and there seems to be little doubt that the world will soon have to look to this section for a considerable proportion of its meat supply, for the production of which there are vast areas of grass lands available in that part of the Argentine north of Santa Fe and reaching up into Bolivia and Paraguay, in many parts of this latter country, in Uruguay, and in Southern Brazil.

Up to the present time nearly all the structural timber used in



Principal Articles of Traffic on the Central Argentine Railway and the Seasons When Carried

the Argentine has been brought from Europe and the United States, but it is now known that there are large forests of pine and cedar in the states of Parana and Santa Catharina, in Brazil and in the territory of Misiones, as well as on the easterly slopes of the Andes to the southwest of Bahia Blanca. In Paraguay there are forests of important hardwoods which will now be made commercially available, as through railway communication has just been opened up between Asuncion, through Corrientes and Entre Rios to Buenos Aires, and a new line is under construction from Villa Rica on the Paraguay Central towards the east which will probably open up important timber industries and reach the forests where much of the yerba mate grows.

At Tucuman, and further north between Salta and Embarcacion, there are important sugar industries, and the business of raising early fruits and vegetables for the markets of Buenos Aires, Rosario, Montevideo, etc., is already assuming considerable proportions. Mendoza and San Juan are the centers of quite important grape and wine industries, producing annually some 66,000,000 gallons of wine in addition to the grapes which are shipped in very large quantities during the season all over the country. Experimental shipments have been made to Europe and the United States, but owing, probably, to improper packing or handling, without great success so far.

The great and important product of the so-called Gran Chaco, which embraces in the Argentine practically all that territory in the inverted triangle with Santa Fe as its apex and the Pilcomayo river as its base, is Quebracho. These trees are not unlike scrub oak in appearance and generally too twisted and crooked to be of use for structural timber. The wood is very hard and durable and is used for railroad ties almost exclusively, for fence posts, telegraph poles; the trimmings, roots, etc., for firewood, and the smaller branches for charcoal. It is very rich in tannin and the whole logs and the extract are shipped in large quantities to Germany for tanning purposes. The whole area of the triangle referred to, so far as is known, and quite a little of it has not yet been explored, comprises large areas of forests, with much quebracho interspersing the open spaces where the rich grasses provide excellent grazing for cattle. There are some parts which are alkaline, some that are swampy, some waterless, but on the whole it is believed that the greater part of it is useful, especially as a cattle country and where maize, for feeding on the spot if not for export, linseed, cotton, tobacco, sugar cane, etc., can be grown. The quebracho forms the bulk of the freight for the Santa Fe railway and the southerly end of the government lines, and this is a product which demands large capacity rolling stock for its transportation. If is of considerable importance, as it provides paying freight for new lines from the beginning while the country is being developed pastorally and agriculturally.

In order to understand the railroad situation of the Argentine it must be realized that Buenos Aires is the center and preeminently the most important city. Its population of 1,300,000 is one-fifth of the total of the whole country; it is the seat of the national government (the limits of the city and the federal district coincide) and the commercial center. Over 80 per cent. by value of all the imports and nearly half the exports pass through this port, and all the banks and large commercial houses have their headquarters there. The relative importance of Buenos Aires may be realized from the fact that Rosario, the next largest city, has less than 100,000 inhabitants.

Besides Buenos Aires, the other ports are Rosario, the second most important city, La Plata, the capital of the province of Buenos Aires, Bahia Blanca, and Santa Fe. The imports which come to these places are mostly coal and lumber, but cereals are exported from all of them as well as from a number of smaller places along the rivers where ocean-going steamers can lie alongside the bank and load, being served by short spurs of the railroads tapping the districts adjacent. The port of Buenos Aires is served by a Port Railway of 5 ft. 6 in. gage operated by the government, with a strong feeling against admitting any other gage. The port of Bahia Blanca has been developed by the railroads, is served by three broad-gage railways over their own lines and has had a very rapid development. The ports at La Plata, Rosario and Santa Fe have mixed gage (5 ft. 6 in. and meter), the first and last operated by the government, and Rosario by a French corporation under a concession for its exploitation.

The cereals are exported principally from Rosario and Buenos Aires in about equal amounts, with Bahia Blanca the next in importance, and then a scattering from a considerable number of smaller ports along the Parana and a few on the Uruguay. The cereals flow naturally to the nearest seaport, ocean-going steamers reaching as far as the city of Santa Fe on the river Parana and Concepcion del Uruguay on the Uruguay river.

Cattle (live) are shipped from all over the country for distribution to the packing plants on the river between La Plata and Rosario. The cattle from Corrientes and parts of Entre Rios go to the plants along the Uruguay river which take, principally, the inferior grades for extracts, dried beef, etc. There is also a considerable movement of cattle from one section to another for growing, fattening, etc., and for shipment to the west coast by driving across the mountains in summer.

There is a good passenger business on nearly all lines, sleeping and dining cars being in general use.

The conspicuous feature of the freight traffic is, of course, the cereals. There is a heavy demand for cars during the ship-

ping season, February to June, and in this period quite a large proportion of cars are returned empty, this unbalancing of the traffic being noticeable on nearly all the lines.

(The second part of Mr. Lavis' article, in which he describes the government regulation of the railways and discusses the gage question and the probable future development of the Argentine railways, will be published in next week's issue.)

EFFECT OF GOVERNMENT OWNERSHIP ON EMPLOYEES*

By A. E. SHULTZ

Conductor on Illinois Central and Member Chicago Division No. 1, O. R. C.

A question of growing interest and intensity in American railroad labor circles is what effect will government ownership of our railways have on the railway brotherhoods?

Plainly it will destroy them.

What would be the further effect of the operation of our railroads by any political party?

It would mean that you as a railroad employee would conform to government regulations.

What would be the policy of the party in power and how would you be secure in your position from one administration to another?

By changing your political faith.

Who would regulate your wages?

The politicians.

What is behind all this clamor for the government ownership of railways?

Is it not a desire to impair the present effectiveness of the railroad brotherhoods and the eventual disruption of these organizations?

Again, who is best qualified to operate the railroads—the trained official or the politician?

There are few men holding official railroad positions who have not had more or less training in practical railroad work. They have been operators, despatchers, conductors, brakemen, engineers, firemen or switchmen. Many of our most efficient officials have come from the lowest positions in the service and they know their jobs, and, knowing them, realize that wrecks will occur just the same under any administration. Men will make mistakes irrespective of the particular political party in power.

Behind this presumably popular movement are two incentives —the craving for greater political power on the part of some politicians and the destruction of the railway organizations on the part of others. Do not be fooled! Once the government gains absolute control over your occupation, your organization as far as effectiveness is concerned is a dream of the past. Your committees will be disbanded, your rights for appeal for increases of pay and the power to demand better working conditions will be forever eliminated. If you propose to stand on the siding and allow this menace to obtain without protest you simply enter into a collision of your rights against those of the government and the government will win.

Refer if you will to the law on civil service regulating the rights of government employees in presenting petitions for increased pay or better working conditions and what do you find?

You are positively disbarred, and any application by committees through organizations subjects those interested to dismissal.

Civil Service Rule 1, Section 1, provides as follows: "Persons who by the provisions of these rules are in the competitive classified service, while retaining the right to vote as they please and to express privately their opinions on all political subjects, shall take no active part in political management or in political campaigns"; and further:

"It is hereby ordered that petitions or other communications regarding public business addressed to the Congress or either house or any committee or member thereof by officers or employees in the Civil Service of the United States, shall be transmitted through the heads of their respective departments or officers, who shall forward them without delay with such comment as they may deem requisite in the public interest. Officers and employees are strictly prohibited either directly or indirectly from attempting to secure legislation or to influence pending legislation except in the manner above described"; and still further:

"An employee may not publish or be connected editorially, managerially or financially with any political newspaper and may not write for publication or publish any letter or article signed or unsigned in favor of or against any political party, candidate, faction or measure."

Do you as a railway employee want to give up your organization and fall in line with the conditions incident to the foregoing which plainly means the destruction of your home, your wage agreement, your independence and your citizenship?

Why, let me ask, is all this noise of "Down with the railroads"? Of course, we all know that many combinations have been made in the past inimical to the public good, stocks watered and money wasted; but why jail the railway employee? Why take from him by one act of law all that he has gained through years of membership in his organization? It has taken years of hard work, cash and self-sacrifice to bring wages and working conditions up to their present standard, and do you not know that if the government takes over our railways and operates them, the politicians and not your organization will fix the wage of your employment?

You will further find you will be subordinate to the government in all that term implies, and that you will be forced to work under every and all conditions and for whatever pay and emolument the government sees fit to allow you. In other words, you will get the sort of treatment the political party in power desires to give you.

Stop! Look! Listen! Draw on your imagination as to what effect government ownership of the railroads would have on you and your brotherhood in view of the recent strike of mail wagon chauffeurs in New York on January 30, 1914. Eleven of the fifteen chauffeurs charged with conspiring to obstruct the mails during the recent strike were found guilty, which conviction may result in a penalty of two years in jail or a $10,000 fine or both. What a condition! What a violation of the Fifth Amendment of the Constitution of the United States, which provides for the life, liberty and happiness of the people!

If you propose to calmly subserve this policy and do not take immediate heed of the semaphores set at danger you will have cause to regret it the balance of your natural life.

There can be no serious objection to sensible and equitable regulation by the state and federal governments of railroad rates, hours of employment, taxes, etc., but to undertake to operate, discipline and set a wage schedule for the employees of the railroads of this country means nothing short of revolution. Write your United States senator and congressman a vigorous protest against this taking away of your individual rights and those of your organization and their transfer into the hands of the politicians.

I might write at length upon the financing and the management of our railroads. I do not agree with all of the policies inaugurated by some railway officials, who to satisfy greed or personal ambition have undertaken, in some instances, to wreck the properties, defraud the stockholders and destroy their credit. This is a matter that can easily be regulated by law, but to "confiscate" the railway brotherhoods and place railway employees at the mercy of the politicians is a menace to public safety. If you have any doubts about this matter compare your condition with that of the railway mail clerk. He is an object lesson before you at all times as practically every railroad man knows the rate of pay, conditions of employment and hours of service of this class of government employee.

The number of railway employees of the country exceeds the

*From the *Railroad Employe* for February 26.

total of professional men of all kinds by a proportion of ten to one. There are five railroad men to every carpenter, bricklayer and other mechanic in the United States. Their number is eight times that of domestic servants and they far exceed the combined number of coal miners and structural iron workers. In the state of Illinois alone railroad employees and their dependents are dominant and could if they were to unite for a common purpose defeat any legislation detrimental to their interest and not in any manner encroach on the rights of other citizens, and this applies to practically every state and congressional district in the Union.

I make the prediction, without any reservation whatsoever, that unless the railroads are accorded a square deal in the physical valuation of their property, whereby the government is now permitted to fix these valuations, 95 per cent. of the properties will be in the hands of a receiver within a year. It will then be only a step to government ownership.

Finally, we as railroad employees as never before in the history of the nation are at present confronted with a condition of vital moment to our future welfare. We are face to face with an issue which tells me that now is the time when we must stand unitedly together, presenting a solid and invincible front against men and measures the preferment of which would mean the government ownership and operation of the railroads of this country.

THE AMERICAN STEEL RAIL SITUATION*

BY ROBERT W. HUNT
Chicago, Ill.

During the last few years there has been renewed interest in and discussion of the question of sound rails, and I know that many rail makers not only have been and are desirous of maintaining the highest standards of manufacture which they may have attained, but have been and are seeking to better their product, in several instances devoting much time and money to that end. At the same time, they realize that the cost of any improvement in quality which they may accomplish must be kept within certain commercial bounds; and that fact is as fully understood by their patrons as by themselves, and it should be kept in mind by all who discuss the question.

As a matter of record, I present herewith a summarized statement of what may be called the mechanical practice of the steel rail mills of the United States and Canada.

It will be noted that the several works differ in their practice as to kind of steel, size of heats, size of ingots, kind of blooming and rail trains, number of passes in the rolls of both trains, and as to direct rolling into rails; also as to the details of the finishing departments of the several mills. In consequence of such variations, there are, of course, differences in the operating practice of the several plants. One thing that, in my judgment, has had a great effect upon the quality of the product of all the mills is that the workmen have been and are paid on a tonnage or piece basis, with, in some cases, an additional prospective bonus based on quantity of product. Unfortunately, after the produced rails had left the works, there was but little chance of the identity or individuality of the workmen in the different departments of the works, who made them, being connected with them. It is true that a number corresponding with that of the heat of steel from which they had been rolled, and the month and year in which they were made, and the name of the works, were branded on each rail, but to actually identify the steel maker who made the steel, the heater who heated it, the roller who rolled it, the shearman who cropped the blooms, etc., would have been a complicated and practically impossible proposition. One result was that if, for any reason, such as delays from accidents to machinery, etc., the quantity of product was threatened, there was temptation to in some way cut corners, the workmen knowing that if the rails were

*From a paper presented at the New York meeting of the American Institute of Mining Engineers, February, 1914.

PRESENTED TO THE NEW YORK MEETING AMERICAN INSTITUTE OF MINING ENGINEERS FEBRUARY 1914. AMERICAN STEEL RAIL MILL PRACTICE
COMPILED BY ROBERT W. HUNT & CO. CHICAGO, ILL. OCTOBER 1ST 1913

NAME OF COMPANY	NAME OF WORKS	LOCATION	NO. OF BLAST FURNACES	RATED PRODUCTION OF EACH FURNACE IN 24 HRS. TONS	BESSEMER CONVERTERS NO.	BESSEMER CONVERTERS RATED CAPACITY OF EACH CONV. TONS	OPEN HEARTH FURNACES NO.	OPEN HEARTH FURNACES RATED CAPACITY OF EACH FURN. TONS	KIND OF STEEL MADE FOR RAILS	NOMINAL SIZE OF INGOT MOLDS INCHES SECT. AT BOTTOM	NOMINAL SIZE OF INGOT MOLDS INCHES WEIGHT	NOMINAL NO. OF INGOTS PER HEAT BESS.	NOMINAL NO. OF INGOTS PER HEAT O.H.	NOMINAL SCRAMBLING PIT CAPACITY NO. OF INGOTS	TYPE OF BLOOMING MILL (1)	NO. OF PASSES GIVEN TO INGOT IN BLOOMING MILL	NOMINAL SECTIONAL SIZE OF BLOOM IN INCHES	BLOOMS RE-HEATED	NO. OF PASSES IN RAIL MILL	NOMINAL NO. OF PASSES TO RAIL INGOT MIN'L	MAX.	NO. OF HOT SAWS GENTY USED	DISTANCE NEAREST HEATING FURNACES FROM ROLLING PASS FEET	AVERAGE NO. OF INGOTS LEAVING FIN PASS & BEING PASSED SAWED	BRAND ON TOP OR BOTTOM SIDE OF INGOTS AS ROLLED	BRAND ON RAIL INDICATES FROM WHAT PART OF INGOT	FOR 100# RAIL NO. OF BLOOMS CUT FROM EACH INGOT	FOR 100# RAIL NO. RAILS MADE FROM EACH BLOOM	FOR 100# RAIL TOTAL NO. RAILS PER INGOT	FOR 90# RAIL NO. OF BLOOMS CUT FROM EACH INGOT	FOR 90# RAIL NO. RAILS MADE FROM EACH BLOOM	FOR 90# RAIL TOTAL NO. RAILS PER INGOT	FROM WHAT NO. SHEARED PER 33 FEET OF RAIL INCHES	NO. ARE RAILS NOT SHEARED WHEN ROLLED	NOTES	NO. OF BLOCKS OR PILLOWS UNDER EACH RAIL	ARE RAILS STRAIGHTENED WHEN ROLLING	NO. OF TIMES REHEATING	NO. OF PAIRS OF DRILLS
Algoma Steel Co.	Algoma	Sault Ste. Marie Ont. Can.	3	2-300 1-400	2	5	5	35	Bess. & O.H.	18 x 19	72	2	18	96	2 High Reversing	15-17	8 x 8	Yes	11	26	28	1	120	30	Bottom	Top	Bot.	2	2	4	6¼					2	3in1 2in1	5	6¼	2	Yes	65	Head	5	5	a-Including those in process of Construction.
Bethlehem Steel Co.	Saucon	So. Bethlehem Pa.	6	2-200 4-450	2	25	10 6	50 75	Open Hearth (straight & dipped)	19 x 23	72		24	120	2 High Reversing	13-15	8 x 8	No	11	24	26	1	211	33	-	Bot.	Top	2	3	6	6¼	2	4in1 3in1	7	6¼	2	4	8	6¼	6	..	90	Base	6	6	
Cambria Steel Co.	Cambria	Johnstown Pa.	8	4-400 4-300	4	12	28	50-100	Bess. & O.H.	20-23 23-25	7/8 7/8	4	16-24	160 1 Mill 180 1 Mill	3- 2 High Rev. 1- Single	14-28	9 x 10	Yes	12	26	40	4	79	30	-	May be either	Various depending on size of Ingot								4[h]	..	70	Head	8	4	b-Continuous Talbot Process furnaces giving 100 heats.
Carnegie Steel Co.	Edgar Thomson	Braddock Pa.	11	500	4	15	14[d]	75	Bess. & O.H.	18¼ x 21½	71	7	40	160	3 High	7	9¾ x 9¾	Yes	13	20	20	4	4.5	15	-	Bot.	Top	2	1	3	6¼	2	2	4	6¼	4	..	85	Base	12	12	c-Also one Nemoth Electric furnace of 15 tons capacity.
Carnegie Steel Co.	Ohio	Youngstown Pa.	6	500	2	12	12	75	Open Hearth	19 x 21	74		26	144	3 High	9	8 x 8	No	11	20	20	3	122	25	..	Bot.	Top	2	2	4	6¼	2	3in1 2in1	5	6¼	2	..	70	Base	6	6	
Colorado Fuel & Iron Co.	Minnequa	Pueblo, Col.	6	2-250 4-425	2	10	12	65	Open Hearth	18 x 20	67		30	144	2 High Reversing	13-17	8 x 8	No[k]	10	23	27	1	108	26	-	Bot.	Top	2	2	4	7	2	2	4	6¼	2	..	60	Head	6	6	d-Likes otherwise stated Mills are non-reversing and have fixed distance between Rolls.
Dominion Iron & Steel Co.	Dominion	Sydney N.S. Can.	6	250	3	18	10	50	Open Hearth (straight dipped)	16½ x 21½	82		18	90	2 High Reversing	13-19	8 x 8	No[k]	11	24	30	1	107	25	..	Top	Bot.	2	2in1 3in1	5	6¼	2	2in1 3in1	6	6¼	2	..	170	Head	4	4	
Illinois Steel Co.	Gary	Gary, Ind.	8	400	None	None	28 14	80 100	Bess. & O.H.	20 x 24	79		24	192	4 Secs. 2 High 1 Set - 3 -	9	8 x 8	No	9	18	18	5	158	29	..	Bot.	Top	2	3in1 4in1	7	6¼	2	3in1 4in1	8	6¼	6	..	80	Base	16	16	e-Varies according to Section of Rail being rolled.
Illinois Steel Co.	South	So. Chicago Ill.	11	500	3	15	26[d]	60	Bessemer (or Electric)	18 x 19½	67	7		168	3 High	9	8 x 8	No	9	18	18	5	60	25	..	Bot.	Top	1	3	3	6¼	1	4	4	6¼	3	..	90	Head	16	16	f-For Standard T. Rails.
Lackawanna Steel Co.	Lackawanna	Buffalo, N.Y.	7	500	4	15	14 2	60-90 200-[illegible]	Bess. & O.H. (straight & dipped)	19 x 19	72	6	34	120	2 Secs. 2 High 1 Set - 2 High Rev.	6	8 x 8	No	9	15	15	1	270	24	..	Top	Bot.	1	4	4	6¼	1	5	5	6¼	4	..	120	Both	12	12	g-Or one commonly used.
Maryland Steel Co.	Maryland	Sparrows Pt. Md.	4	300	3	15	5	60	Bess. & O.H. (straight & dipped)	20 x 21	69	6	22	108	2 High Reversing	13-17	8 x 8	No	11	24	28	1	168	32	..	Bot.	Top	2	2	4	6¼	2	2in1 3in1	5	6¼	6	No	150	Head	7	7	h-Mill protected by roof from weather.
Monterey Iron & Steel Co.	Monterey	Monterey Mexico	1	350	1	10	4	30	Open Hearth	19 x 22	66		16	72	2 High Reversing	15	8 x 8	Yes	10	15	25	1	205	40	"	Top	Bot.									2	Yes	60	Head	3	3	j-Including 4 Automatic Machines.
National Tube Co.	Lorain	Lorain, Ohio	5	500	2	15	6	90	Open Hearth	22 x 26	72		22	84	2 High Reversing	21-25	Various[g][e]	Yes	11[f]	32	36	2	123	26	Top	Bot.	Top	3	2	6	6¼	3	2	6	6¼	4	No	120	Both	12[j]	11	
Pennsylvania Steel Co.	Pennsylvania	Sheldon, Penn.	5	2-300 1-500	3	15	8 2	75 80	Bess. & O.H. (straight & dipped)	19 x 19	74		30	60	3 High	9	Various[g]	Yes	11[f]	20	20	2	8	24	-	Top	Bot.	2	2	4	6¼	2	2	4	6¼	4	Yes	70	Both	4	6	k-Some Blooms may be re-heated.
Tennessee Coal Iron & R.R. Co.	Ensley	Ensley, Ala.	6	350	2	25	8	100	Open Hearth (Dipped)	23 x 23	79		30	144	2 High Reversing	11-15	8 x 8	No[k]	10	21	25	4	120	25	Bot.	Top	Bot.									4	Yes	75	Head	10	10	

Summarized Statement of Practice in Rail Mills of the United States and Canada

once out of the mill they need not worry over any individual responsibility, which feeling was simply human.

In an endeavor to meet this and other phases of the situation, some two years ago I ventured the establishment of a system of more constant and thorough inspection of rail making than had been generally, if at all, practiced. In this movement I received the support at first of several and later of many of the railroad companies of this continent, and I am happy to say that I have also received the loyal support of the officials of the several steel companies.

I have repeatedly shown that without sound ingots there will not be any certainty of producing sound rails; and that, as each ingot is an individual steel casting, some means should be adopted of testing for soundness the rails produced from each ingot; and until reliable ways of casting sound ingots are adopted the importance of such testing should not be overlooked or underestimated. It is possible to make sound ingots. It will cost more than the present practices; but is that a good argument against it?

There is another feature of the situation which demands and is receiving serious consideration from railway officers, consulting engineers, the steel works officials, and others. That is, the desirability, if not the absolute necessity, of increasing the weight of rail sections. A number of such sections have been designed, and some have been rolled, and the rails are in use; but there is a metallurgical feature involved which should not be overlooked.

The experience of many railways has been that their earlier rails, which were of lighter sections, gave better service than the later heavier ones, and the track men will tell you that when they cut one of the old rails they found a close, fine-grained structure, while the larger rails show a more or less coarse one. The old lighter rails permitted the fining effects of the rolling to penetrate, and, the mass of metal in their heads being comparatively small, the effect of the interior contained heat passed off sooner. The foregoing conditions result in the webs and flanges of all rails having a finer structure than their heads; therefore, as we increase the size of the rail sections we will certainly decrease their proportionate strength, and under present manufacturing conditions the heavier rails will have less resistance to the abrasive wear of the traffic. Nevertheless, there seems to be a necessity for heavier rails, and so much the better, if we can also make them proportionately stronger.

Excepting in the ability to roll rails by the use of fewer passes in the rolls, and to handle the operations mechanically and automatically, there have not been any radical changes in rail rolling. The plan of rolling reductions has remained much the same. Some experiments have been made, and various schemes have been proposed, but none of them are in active use. In my judgment, the present situation demands serious consideration, even though it should require very radical changes in the rolling machinery of the existing rail mills. If we must have rails with more metal in their heads, as well as thicker webs and flanges, it is most important that the work of reduction and formation from the, say, 8 in. by 8 in. section of the blooms shall be applied in a way to penetrate and fine the metal in the rail heads. I shall not here attempt to particularize the way, but no doubt a modification of the universal mill, such as the Gary mill for structural sections, will suggest itself as one possible way, and I know of several schemes which contemplate putting work on the top of the heads in addition to only the sides, as is the case with the present mills. If that must be accomplished to solve the problem, it can and will be done.

Once more I emphasize the truth that the physical treatment of the metal is of at least equal importance with its chemical composition.

OIL BURNING LOCOMOTIVES IN INDIA.—The Northwestern Railway of India has recently built its first locomotive fitted to burn oil as fuel.

INCREASE IN OPERATING COSTS ON GERMAN GOVERNMENT AND BRITISH RAILWAYS

How universal has been the upward trend in railway expenses of operation against which American railways now are asking relief through more adequate compensation is reflected strikingly in a statement by the German Railroad Union, which speaks for the almost wholly government owned and operated railways of Germany, according to a bulletin issued by the Bureau of Railway News and Statistics. The bureau says in its bulletin:

That government operation, even on the frequently lauded German state system, is far from a guaranty against advancing costs of operation may be learned from the statement of the Railway Union itself, that the now available results for the fiscal year 1912 show everywhere the glowing revenue exhibitions of the year, but against them also a notable and decided growth in expenses, so that although the net has shown some gain, the operating ratios, after a relaxation from 1910 to 1911, have again soared into the heights.

Following are the ratios of expenses to revenues on the various portions of the German state railways in the two years:

	1911	1912	Per cent. increase
Prussian Hessian	65.23	66.30	1.7
Bavarian	67.92	70.00	2.8
Saxony	67.42	74.15	6.7
Wurttemberg	68.31	68.74	0.6
Baden	68.97	69.97	1.0
Alsace-Lorraine	70.44	67.22	*3.2
Mecklenburg	73.75	74.25	0.5
Oldenburg	74.60	77.58	3.0

*Decrease.

The single decrease in operating ratio, that of Alsace-Lorraine, is attributed to unusual growth of traffic due to local expansion of the iron industry.

In view of such a showing doubt is expressed as to the outcome for 1913, during which year traffic reflected with remarkable similarity the late contraction which occurred in the United States.

"Perhaps there will be a continuance of the rising revenues," says the German statement, "though with smaller gains than in 1912, and also of the soaring expenses with resulting smaller nets and climbing operating ratios. Revenues both in passenger and freight traffic showed gains to the end of October. Even November brought a passenger traffic increase, but in freight there was a loss of 2 per cent. against 1912. Apparently when revenue returns for all of 1913 are at hand they will show a decided slump in the second half year."

This universal drop in railway traffic and unchecked expense increase in the closing months of 1913, so decided in the United States and Germany, is further emphasized by reports received by the bureau covering 50 British railway companies. Freight and passenger revenues of these roads for 1913, comprising all the important British mileage, reach the highest total of history at $587,000,000, a gain of almost $37,000,000 over either 1912 or 1911, practically all of the gain being even in the first three quarters of the year.

As in the United States, however, these record earnings do not mean prosperity for the carriers. "Unfortunately there is another side of the question to be borne in mind," says the London *Railway News*, "and the matter of expenses is nowadays fully as important as that of earning power. The dividend declarations for the first half of the year showed how seriously higher expenses had eaten into the large revenue secured and we anticipate that the increase for the second half year will be fully as great."

NEW RUSSIAN RAILWAY PROPOSED.—The Council of Ministers of Russia has given its approval to a proposed line of railway between Terijoki and Björkö, which will give St. Petersburg and northern Russia direct access to Björkësund the finest natural harbor on the Gulf of Finland. It is intended to develop the port in the interests of both imperial and Finnish trade.

Analysis of Steam Train Resistance

A Study of a Number of Tests to Determine the Average Values of the Various Items Concerned

By H. A. Houston

Mechanical Department, Rock Island Lines, Chicago, Ill.

For most cases dealing with locomotive tractive effort, it is preferable to deal with it in terms of the tender drawbar pull, or, in other words, it is desirable to know the available drawbar pull which can be utilized for hauling trains. To arrive at a value for this it is necessary to deduct for the various losses occurring between the cylinders and the tender drawbar. These losses may be classified thus:

First: R_1 = Machine friction of the engine, which includes the rolling resistance of the drivers;

Second: R_2 = Rolling resistance of the leading and trailing trucks;

Third: R_3 = Rolling resistance of the tender;

Fourth: R_4 = Resistance which the atmosphere offers to the head end of a train;

Fifth: R_5 = The resistance due to grade.

Evidently the net tender drawbar pull (T. E.) for any locomotive is:

$$\text{T. E. (net)} = \text{T. E. (at cylinder)} - R_1 - R_2 - R_3 - R_4 \pm R_5 \quad (1)$$

The sign of R_5 is positive for down grades and negative for up grades.

This equation is general in ts application.

RESISTANCE DUE TO ENGINE FRICTION

Machine friction (sometimes called engine friction) of steam locomotives, is measured as the power absorbed by the frictional resistances of the working parts of the engine. If represented by a formula, we have:

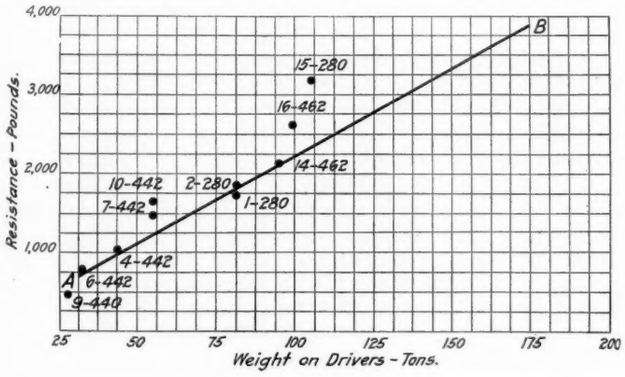


Fig. 1

(Indicated cylinder power) — (Delivered power at drawbar) = (Power absorbed by the machine)

And

$$\frac{\text{Delivered power}}{\text{Indicated cylinder power}} \times 100 = \text{Machine efficiency in per cent} \quad (2)$$

It must be borne in mind that locomotive efficiency can vary between the limits of zero and 85 or 90 per cent., depending on the speed and drawbar pull. In other words, the efficiency varies with the drawbar pull, speed, and cut-off, and it is not possible to assign a definite value for the efficiency unless these conditions be fixed. For example, a locomotive and tender running light and at maximum speed, exert no available drawbar pull, and the efficiency is therefore zero. In order to prevent ambiguity when the term efficiency is used, it is understood that the term general maximum efficiency is implied.

Machine friction may be expressed in terms of mean effective pressure, and for simple engines the usual tractive effort equation gives a value of drawbar pull which is the equivalent of machine friction when the force exerted by the cylinders is just sufficient to produce motion of the drivers with zero load at the engine drawbar, as

$$\text{D. B. P.} = \frac{P\,d^2\,S}{D}$$

where *D. B. P.* represents the equivalent pull due to machine friction, *P* the frictional mean effective pressure, *d* the diameter of the cylinder in inches, *S* the stroke in inches, and *D* the diameter of the drivers in inches. This friction of steam locomotives may consume from 10 to 20 per cent. of the indicated horsepower, depending upon the kind and method of lubrication and the condition of the mechanism. To show a comparison between the actual machine friction as developed during tests and the machine friction as derived by formulas, Table I is inserted.

Columns 1 to 7 are self explanatory. Column 8 is the calculated machine friction expressed in pounds of drawbar pull, determined by the formula recommended by the American Railway Engineering Association as expressing the relation existing between the friction of the moving parts, the weight on drivers, and the number of axles of steam locomotives. The formula is

$$R = 18.7\ W_d + 80\ A \quad (3)$$

where R represents the total machine friction in pounds of drawbar pull, W_d the tons weight on the drivers, and A the number of driving axles.

Column 9 is the machine friction expressed in pounds of drawbar pull, and is calculated by the formula used by the American Locomotive Company for the power consumed between the cylinders and the locomotive drawbar. The formula is

$$R = 22.2\ W_d \quad (4)$$

where R represents the total machine friction in pounds of drawbar and pull W_d represents the tons weight on the drivers.

TABLE I—MACHINE FRICTION OF STEAM LOCOMOTIVES

Item.	Type.	Weight on drivers, tons.	Number of driving axles.	Tons weight per axle.	Minimum friction loss, per cent., avg. test.	Friction loss D. B. pull avg. lb. test.	A. R. E. A. Frict. D. B. P. = 18.7 Wd + 80 A, lb.	A. L. Co. Frict. D. B. P. = Wd × 22.2 lb.
1	2	3	4	5	6	7	8	9
1....	2-8-0	81.30	4	20.33	11.3	1,710	1,840	1,810
2....	2-8-0	82.25	4	20.56	12.0	1,822	1,850	1,830
3....	2-10-2	116.83	5	23.37	14.0	3,744	2,582	2,590
4....	4-4-2	43.93	2	21.96	18.5	1,035	983	977
5....	4-4-2	49.60	2	24.80	19.0	1,968	1,087	1,100
6....	4-4-2	32.68	2	16.38	12.25	763	770	725
7....	4-4-2	55.00	2	27.50	15.0	1,496	1,190	1,220
8....	2-8-0	86.50	4	21.63	21.2	3,530	1,940	1,920
9....	4-4-0	27.00	2	13.50	10.21	465	665	598
10....	4-4-2	55.00	2	27.50	18.0	1,654	1,190	1,220
11....	0-8-8-0	188.40	8	23.30	16.1	7,360	4,163	4,145
12....	2-8-8-2	185.00	8	23.10	21.8	10,360	4,100	4,110
13....	0-8-8-0	204.50	8	25.60	11.5	7,600	4,464	4,540
14....	4-6-2	94.80	3	31.60	13.8	2,110	2,010	2,105
15....	2-8-0	105.50	4	26.40	13.2	3,333	2,295	2,342
16....	4-6-2	98.90	3	32.60	13.8	2,610	2,090	2,190
17....	0-8-8-0	204.40	8	25.60	....	5,100	4,470	4,540

The following notes pertain to the tests of the locomotives which are tabulated in Table I:

Item 1.—Locomotive 734, Lake Shore & Michigan Southern, 2-8-0 Type, Simple. Test was made on the Pennsylvania testing plant at St. Louis, Mo., in 1904. The machine efficiency of this locomotive was very high, being in some cases over 90 per cent., which may be accounted for, in part, by the fact that it had been in service a long time and was consequently well worn. It was equipped with grease cups on the rods and oil was used in the driving box cellars.

Item 2.—Locomotive 585, Michigan Central, 2-8-0 Type, 2 Cylinder,

Cross-compound. Test was made on the Pennsylvania testing plant at St. Louis, Mo., in 1904. The machine efficiency was uniformly high and ranged from 78.98 per cent. to 94.16 per cent. Oil lubrication.

Item 3.—Locomotive 929, Atchison, Topeka & Santa Fe, 2-10-2 Type, 4 Cylinder, Tandem Compound. Test was made on the Pennsylvania testing plant at St. Louis, Mo., in 1904. The machine efficiency ranged from 80.33 per cent. to 90.48 per cent. While the speeds were low, these figures appear remarkably high for a locomotive having so many journals and moving parts. Oil lubrication was used, but due to the small range of loads and speeds covered in the test, its graphical representation has been omitted.

Item 4.—Locomotive 2512, Pennsylvania Railroad, 4-4-2 Type, 4 Cylinder, Balanced Compound. Test made at St. Louis, Mo., in 1904. The machine efficiency ranged from 74.74 per cent. to 89.45 per cent. Oil lubrication.

Item 5.—Locomotive 535, Atchison, Topeka & Santa Fe, 4-4-2 Type, 4 Cylinder, Balanced Compound. Test made at St. Louis, Mo., in 1904. The machine efficiency ranged from 61.53 per cent. to 87.84 per cent. Grease lubrication was used, therefore graphical representation of the frictional drawbar pull has been omitted.

Item 6.—Locomotive 628, Hanover, 4-4-2 Type, 4 Cylinder, Balanced Compound. Test made at St. Louis, Mo., in 1904. The machine efficiency ranged from 78.94 per cent. to 94.08 per cent. Oil lubrication.

Item 7.—Locomotive 3000, New York Central & Hudson River, 4-4-2 Type, 4 Cylinder, Balanced Compound. Test made at St. Louis, Mo., in 1904. The machine efficiency ranged from 68.47 per cent. to 93.95 per cent. At a nominal speed of 80 r. p. m. and a nominal cut-off of 35 per cent., the machine efficiency was 68.47 per cent. At the same speed, but with a nominal cut-off of 45 per cent., the machine efficiency was 84.89 per cent.

Item 8.—Locomotive 1499, Pennsylvania Railroad, 2-8-0 Type, Simple. Test made at St. Louis, Mo., in 1904. At a given speed, the general law governing the variation of the friction measuring factors was not apparent. In fact, the machine friction appeared to be constant for any given speed. The machine efficiency ranged from 72.89 per cent. to 84.82 per cent., which may be accounted for by the newness of the locomotive and by the fact that it was lubricated throughout with grease. Due to the grease lubrjcation, its graphical representation has been omitted.

Item 9.—Locomotive Schenectady No. 1, Purdue University, 4-4-0 Type, Simple. Tests made at Lafayette, Ind., with oil as a lubricant. The machine efficiency varied from 84.35 per cent. to 92.62 per cent.

Item 10.—Locomotive 5266, Pennsylvania Railroad, 4-4-2 Type 2 Cylinder, Simple. Test made on the Pennsylvania testing plant at Altoona, Pa., in 1909. Throughout this series of tests, the driving axle bearings were lubricated with oil. The main and side rods, except the front ends of the main rods, were lubricated with hard grease. The cylinders were lubricated with oil by means of a sight feed lubricator.

Item 11.—Locomotive 993, Norfolk & Western, 0-8-8-0 Type, Mallet Compound. Test was made on the road (see *Railway Age Gazette*, May 19, 1911, page 1153). The data for this locomotive, as presented in the above table, is the average only. The mechanical efficiency was quite uniform,

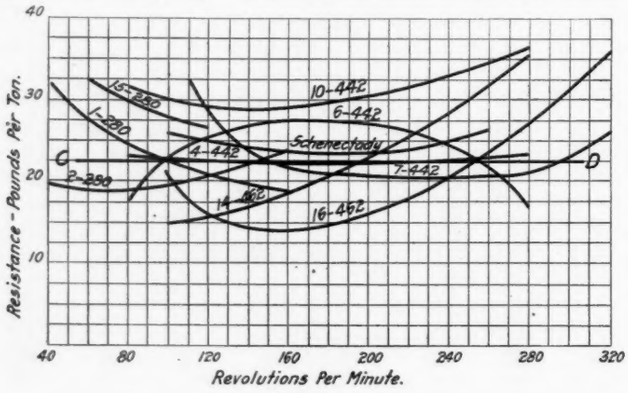


Fig. 2

varying from 81.4 per cent. minimum to 88.6 per cent. maximum; and the average of 83.9 per cent. is unusually high for a Mallet type locomotive. No correction was made for grade and tender resistance.

Item 12.—Locomotive 998, Norfolk & Western, 2-8-8-2 Type, Mallet Compound. Test made on the road (see *Railway Age Gazette*, May 19, 1911, page 1153). The data presented in the above table is the average, based on six trips. No correction was made in the report for grade and tender resistance. Oil lubrication was used.

Item 13.—Locomotive 2600, Erie Railroad, 0-8-8-0 Type, Mallet Compound. Test was made on the road (see *American Engineer & Railroad Journal*, June, 1908, page 213). No corrections were made for grade and tender resistance. Oil lubrication was used. The results shown are the average for three runs.

Item 14.—Locomotive 7166, Pennsylvania Railroad, 4-6-2 Type, 2 Cylinder, Simple. Test was made on Pennsylvania testing plant at Altoona, Pa., in 1910. Oil lubrication was used. The results shown are the average for 14 tests.

Item 15.—Locomotive 1134, Pennsylvania Railroad, 2-8-0 Type, 2 Cylinder, Simple. Test was made on Pennsylvania testing plant at Altoona, Pa., in 1911. Oil lubrication was used. The results shown are the average for five tests.

Item 16.—Locomotive 3395, Pennsylvania Railroad, 4-6-2 Type, 2 Cylinder, Simple. Test was made on Pennsylvania testing plant at Altoona, Pa., in 1911. Oil lubrication was used. The results shown are the average for 39 tests.

Item 17.—Locomotive 3397, Pennsylvania Railroad, 0-8-8-0 Type, 4 Cylinder, Mallet Compound. Test was made on the road, 1911. Grade has been eliminated by making tests in both directions, all of which are averaged and shown here.

These figures seem to confirm the fact that the machine friction remains constant as the speed increases, which is con-

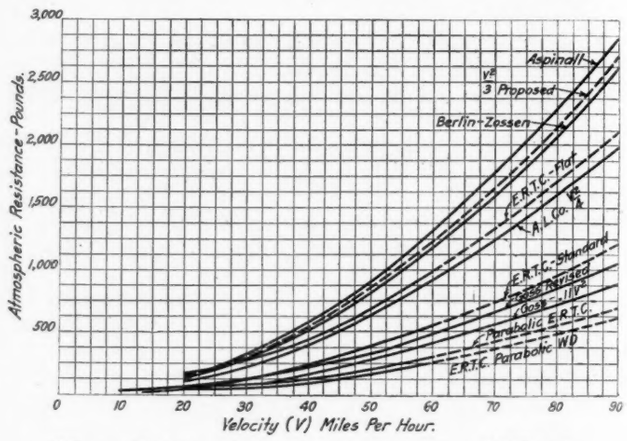


Fig. 3—Variation of Atmospheric Resistance with Speed

sistent with the general laws of rubbing friction for speeds greater than 25 ft. per minute. The plotted points in Fig. 1 represent graphically the average frictional resistance in pounds pull of the several locomotives which are tabulated in Table I. All the plotted points are numbered to correspond with the items tabulated in that table, and are representative of those locomotives which were equipped with oil cellars and hard grease cups on the rods.

The line *AB* which is shown in this figure, is the graphical representation of $R = 22.2\ W_d$, where R is the resistance in pounds of drawbar pull and W_d is the tons weight on the drivers of any locomotive. With the exception of point 15, which corresponds to the data furnished for item 15 in Table I, we can say that the curve *AB* is a fair representation of how machine friction varies with the weight on drivers. The curves in Fig. 2 represent graphically how the results of tests for machine friction in pounds per ton weight on drivers vary with speed. The curve *CD* in this figure represents graphically the formula $R = 22.2\ W_d$, which as previously stated, depicts the relation between R and W_d, independent of speed. These curves are designated to correspond with the items given in Table I. In these curves oil as a lubricant was used in the cellars and hard grease was used on the rods. It would seem from this exhibition of curves, that the line *CD* is probably as good an average as could be expected.

Of the two formulas $R = 22.2\ W_d$ and $R = 18.7\ W_d + 80\ A$, the former is much the simpler for determining machine friction in pounds of drawbar pull, and it gives results which are more consistent with those obtained under actual test conditions. In this formula it is assumed that the number of axles is a function of the weight of the locomotive and that the weight per axle is a constant quantity.

RESISTANCE OF LOCOMOTIVE TRUCKS

The resistance of the leading and trailing trucks of a locomotive is assumed to be the same as for the car axles in the

train which have an equivalent axle load. This is expressed by the formula

$$R = \frac{V + 41}{\frac{W}{0.684\frac{W}{A} + 3.8}} \quad \ldots\ldots(5)$$

Where: R represents the resistance in pounds per ton,
V the speed in miles per hour,
W the load in tons, and
A the number of axles carrying the load W.

This proposed equation is taken from the University of Illinois train resistance data, and may be accepted as general in its application.

ATMOSPHERIC RESISTANCE

In the discussion of atmospheric resistance, or that resistance offered by still air to the forward movement of a locomotive and tender, it is desirable to state the equivalent effect of the air in pounds pull at the tender drawbar. The experiments*, which have been performed to determine the law governing the variation of air resistance with speed, have been limited in number and the conclusions have been unsatisfactory and uncorroborative, especially for steam railroad practice. Atmospheric resistance is but a small part of the total resistance when low speeds and heavy trains are considered. But at high speeds this resistance is predominant for light or for single car trains.

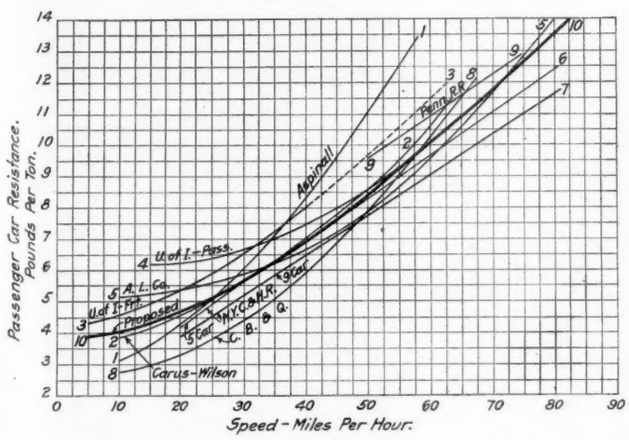


Fig. 4--Variation of Passenger Car Resistance with Speed

The results of the experiments conducted at Purdue University by Dr. W. F. M. Goss, and published in his book, "Locomotive Performance," are the results of tests performed on small model cars, similar to freight cars in outline and proportion, but about 1/1024 of the cross-sectional area. Had the dimensions of the model car been equal to those of a full sized car, the results would have been accepted unquestioned. But since the results actually observed from the small models are assumed to be proportional to those expected from actual cars in service, the question arises as to whether the effect of the air upon solids varies directly with the area of the exposed flat surface, or with the perimeter of the same surface, or with the product of the two.

The results of these tests at Purdue University justified the use of the following equation as representing the variation of atmospheric resistance with velocity:

$$R = P\,A\,V^2 \quad \ldots\ldots(6)$$

Where: R = total equivalent head end resistance at tender drawbar, in pounds.
P = pressure per square foot on a flat surface, in pounds.
A = cross-sectional area of locomotive, in square feet.
V = velocity of train in miles per hour.

*Some of these experiments are:
1. The Purdue University Tests, made in 1897;
2. The tests made by Prof. F. E. Nipher in 1898, and published in Vol. 8 of the St. Louis Academy of Science;
3. The Berlin-Zossen Tests, made in 1903;
4. The Electric Railway Commission Tests, made in 1904;
5. Tests made by J. A. F. Aspinall in 1902, Transactions I. C. E.

If we substitute in equation (6) the values which were justified by the results obtained from the Purdue experiments, we have

$$R = 0.00108 \times 103.5 \times V^2$$
$$R = 0.11\ V^2 \quad \ldots\ldots(7)$$

Equation (7) is used by Dr. Goss as expressing the relation existing between atmospheric resistance and velocity for a locomotive and tender running at the head of a train. But today, modern equipment changes the value of A from 103.5 as in equation (7) to 120, which makes it necessary to revise that equation to:

$$R = 0.13\ V^2 \quad \ldots\ldots(8)$$

in which R and V represent the same variables as before. Graphs of equation (7) and (8) are shown in Fig. 3, marked "Goss" and "Goss Revised" respectively.

The tests performed in 1904 by the Electric Railway Test Commission and published by them in 1905, give the results of atmospheric resistance tests which are shown by four curves in Fig. 3 and marked "E. R. T. C." These curves are plotted on a basis of 120 sq. ft. projected area of front end, and are the results of using four different shaped vestibules; the parabolic-wedge, the parabolic, the standard, and the flat, each operating through a system of levers to a dynamometer where the direct atmospheric pressures were measured. These experiments could hardly be accepted as conclusive, but they do show that atmospheric resistance, for speeds up to 60 m. p. h., varies as the square of the velocity.

The results of one of the most complete experiments on atmospheric resistance, are found in the report† of tests conducted on the German military railroad during the months of September, October and November, 1903, and which are commonly known as the Berlin-Zossen tests. In these tests the assumption was made that train resistance other than air might be put into the form:

$$A + BV \quad \ldots\ldots(9)$$

A and B being constants.

When air resistance was included, the expression then took the form:

$$A + BV + CV^2 \quad \ldots\ldots(10)$$

and the vital point to be determined was the coefficient C for a normal plane surface. These tests were especially planned with respect to the determination of this quantity, and the results thus obtained are probably by far the most trustworthy yet reached. The net result of the Berlin-Zossen tests was to give:

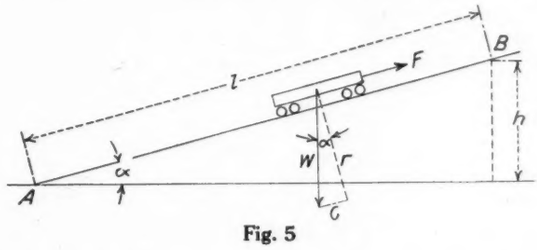


Fig. 5

$$R' = 0.0052\ V^2 \quad \ldots\ldots(11)$$

for a flat surface when the pressure is taken in kilograms per square meter, and the speed in kilometers per hour.

Equation (11), when reduced to the English system of units, gives

$$R'' = 0.0027\ V^2 \quad \ldots\ldots(12)$$

Where: R'' = resistance in pounds per square foot.
V = velocity in miles per hour.

If we assume a head end area of 120 sq. ft., then equation (12) may be written

$$R = 0.324\ V^2 \quad \ldots\ldots(13)$$

Where: R = total head end resistance in pounds drawbar pull for the flat surface.
V = velocity in miles per hour.

Equation (13) is plotted and shown in Fig. 3 where it is

†Published by the "Studien-Gesellschaft für Elektrische Schnellbahnen," Berlin.

marked "Berlin-Zossen," and is representative of the variation of atmospheric resistance with speed for a flat surface.

The American Locomotive Company use equation (6) for determining atmospheric resistance by substituting in it the values, P = 0.002, and A = 120.0 which reduces it to

$$R = 0.24\ V^2 \text{ for an area of 120 sq. ft., or approximately: } R = \frac{V^2}{4} \quad ..(14)$$

In which: R = atmospheric resistance in pounds pull at tender drawbar.
V = velocity in miles per hour.

Equation (14) is shown as a curve in Fig. 3, and is marked "A. L. C. — $\frac{V^2}{4}$."

J. A. F. Aspinall, in the results‡ of his tests made on the London & North Western Railway in England, gives the variation of atmospheric resistance with speed in the form shown by equation (6). He experimentally ascertained the relation between velocity and atmospheric resistance by means of collectors and anemometers. If in equation (6) we substitute his result wherein P = 0.003, and if A = 120.0, we have

$$R = 0.36\ V^2 \quad .....(15)$$

In which: R = atmospheric resistance in pounds pull at tender drawbar.
V = velocity in miles per hour.

Equation (15) is shown as a curve in Fig. 3 and is marked "Aspinall."

The atmospheric resistance offered by the sides of a train is thought to be comparatively small, although there is a lack of data to substantiate this idea. It seems to be the opinion of experimenters that if there is an appreciable side resistance, it is not dependent so much upon the action of still air as upon the direction and strength of prevailing winds. Especially is this so with the modern type of passenger equipment where the train is vestibuled and the windows flush with the sides of the car.

After careful study of the experiments above cited, the curve marked "Proposed" in Fig. 3, whose equation is

$$R = \frac{V^2}{3} \quad .....(16)$$

Where: R = atmospheric resistance in pounds of drawbar pull, for an area of 120 sq. ft.
V = velocity of train in miles per hour,

is suggested by the writer as representing the variation in atmospheric resistance with speed, and has been used throughout this article wherever atmospheric resistance has been taken into consideration.

TENDER RESISTANCE

The resistance which the tender offers to the movement of a train is measured in pounds of drawbar pull and is calculated the same as for the cars in the train, with the exception that the weight of the tender is always taken at 70 per cent. of its maximum loaded weight in order to correct for the continuous fluctuations in the weights of coal and water. This is expressed by the equation

$$R = \frac{V + 41}{.12W_m + 3.8} \quad .....(17)$$

Where: R = resistance in pounds per ton,
V = velocity of train in miles per hour,
W_m = maximum loaded weight (light weight plus capacity) of the tender in tons.

CAR RESISTANCE

Freight Car Resistance.—Experiments in train resistance have disclosed the fact that the resistance is not only a function of speed, but also a function of the car weight or axle load. However, since practically all American freight cars are of four axles, either form of expression is acceptable. Ordinarily, train resistance is expressed as a curve or an equation which defines the relation existing between the resistance and the speed. Such a relation is satisfactory, provided the car weights or axle loads are the same, but if they fluctuate, then a separate expression for each loading is required. Since we know that car weights and capacities are decidedly irregular, it becomes necessary to express the variation of train resistance with speed and with the average gross car weights. Professor E. C. Schmidt has done this for trains running at uniform speed on tangent level track when the air temperature is above 30 deg. F., by expressing the relation existing between train resistance in pounds per ton and the average gross weight per car in tons for different speeds in miles per hour. In this connection, there is no better presentation of facts than those which are set forth in bulletin 43, published by the Engineering Experiment Station of the University of Illinois.

The results of the tests may also be approximately expressed by the following single empirical equation in which the resistance is stated in terms of both velocity and car weight, as

$$R = \frac{V + 39.6 - .031\ W}{4.08 + 0.152\ W} \quad .....(18)$$

Where: R = freight car resistance, pounds per ton,
V = velocity in miles per hour,
W = average weight of car, in tons.

Passenger Car Resistance.—One of the most thorough investigators of this subject is J. A. F. Aspinall, who in 1892 conducted some very extensive tests on the London & North Western, in England, to determine the resistance in pounds per ton of bogie coaches. Although these tests had to do with passenger equipment, their value from an American standpoint is questionable. Mr. Aspinall's curve of passenger car resistance when plotted against speed, as shown by curve No. 1 in Fig. 4, is a fair average of the family of curves when considered in the velocity range of 10 to 30 miles per hour.

By an analytic study of the tests conducted by Mr. Aspinall and others, Mr. Carus-Wilson has presented some very good ideas regarding train resistance, although his lines of attack seem to be rather questionable in several instances, which might be due to the lack of proper data to check his theoretical calculations. It is to be noted that his results when plotted in the form of a curve, shown as curve 2, Fig. 4, give a good average curve. Its equation is:

$$R = \frac{50}{\sqrt{T}} + .03\ V + \frac{.002\ V^2}{T} A \left(1 + \frac{N-1}{10}\right)$$

In which: R = the resistance in pounds per ton,
V = the speed in miles per hour,
T = the weight of car in tons,
N = the number of cars in the train,
A = end cross-section in square feet.

Curve 3, is the average result of a number of tests performed by the University of Illinois, described in their bulletin No. 43, referred to above. It represents the resistance of a 40-ton freight car, or the resistance of a car which has a 10-ton axle load. For passenger work this might be considered as the resistance curve for a 12 wheel car, thus requiring it to have a total weight of 60 tons, which is representative of modern through passenger car equipment.

Curve 4 is the result of one test performed by the University of Illinois on a 345-ton passenger train, which averaged 8.39 tons weight per axle. The train was a mixed train of eight and twelve wheel cars. No reliance can be put on the results of this test, due to the absence of a check on the results and to the impossibility of an analytic study of the controlling factors in passenger car resistance.

Curve 5 is the one used by the American Locomotive Company. This curve has higher than average resistance values for speeds below 30 m. p. h., and average values of resistance for speeds above 30 m. p. h.

Curves 6 and 7 are the results of tests made in 1902 by the New York Central with 5 and 9 car passenger trains.

Curve 8 represents the results of tests on the Burlington.

Curve 9 represents the results of tests on the Pennsylvania.

Curve 10, proposed by the writer, which is shown in Fig. 4, is probably as good a curve as can be had to represent the resistance of passenger cars irrespective of the weight per axle

‡Published in the Transactions of I. C. E. in 1902.

and the kind of trucks, that is, whether 4-wheel or 6-wheel trucks. This curve may be represented by the equation

$$R = 3.5 + 0.038\,S + 0.0012\,S^2 \quad \ldots\ldots\ldots\ldots\ldots\ldots (19)$$

Where: R represents the resistance in pounds per ton, and S the speed in miles per hour.

To the writer, this curve seems to approximate average conditions, as undoubtedly the group of curves shown in Fig. 4 could hardly be comparable, as train resistance has too many varying and inseparable factors, viz.: journal temperature, journal size and journal lubrication, wind direction and velocity, flange friction, etc., which are uncontrollable in ordinary train operation.

ACCIDENTAL RESISTANCES

Grade Resistance.—If the grade is expressed in per cent., then it is the ratio of distance the train is raised to the distance traveled. If the grade is 1 per cent. and the distance traveled is one mile (5,280 ft.), then a 1 per cent. grade is equivalent to 52.8 ft. change in elevation. For a train of one ton moving on a 1 per cent. grade, we have:

$$g = 2{,}000 \times 0.01 = 20 \text{ lb.} \quad \ldots\ldots\ldots\ldots\ldots\ldots (20)$$

Where: g = grade resistance in pounds per ton of train for each one per cent. grade.

In Fig. 5 a train is shown in equilibrium under the action of three forces due to:

W = weight of train,
r = normal reaction between wheel and rail,
F = drawbar pull.

Accordingly,

$$F = c = W \sin \alpha = W \frac{h}{l}$$

Now for a train of one ton on a grade of one foot per mile, we have

$$F = 2{,}000 \times \frac{1}{5{,}280} \text{ lb.} = 0.379 \text{ lb.} \quad \ldots\ldots\ldots\ldots\ldots\ldots (21)$$

Where: F = g = grade resistance in pounds per ton of train for each foot rise per mile of track.

For a down grade, the resistance will be the same numerically, but will be negative.

Curve Resistance.—Curve resistance may be defined as the resistance caused by the friction due to the center plates, side bearings, grinding of the flanges against the rails, slipping of the wheels, etc. Evidently curve resistance varies with the degree of curve, the speed, and the superelevation of the outer rail. Curve resistance is usually assumed equivalent to a retarding force of 0.5 lb. per ton for each degree of curve.

THE PENNSYLVANIA'S FIGHT WITH THE SNOW

The disastrous snow and sleet storm which prevailed in central and northern New Jersey, March 1 and 2, was briefly reported in the *Railway Age Gazette* of March 6. The experiences of the Pennsylvania Railroad in restoring its New York division have been described in a pamphlet issued by the company's department of publicity and from this we take the following account:

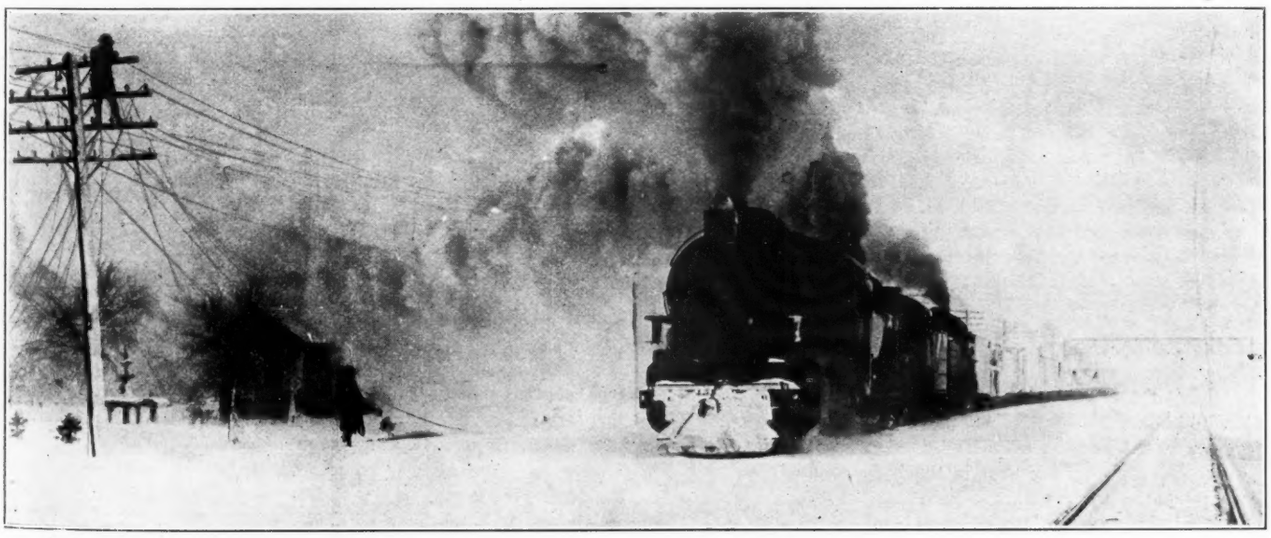
To repair the actual damage done will cost the Pennsylvania Railroad more than $500,000. The loss direct and indirect will amount to $2,000,000. The territory affected is in a square with corners at Philadelphia, Manunka Chunk, Jersey City and Seaside Park. In this region the Pennsylvania has 1,600 miles of track, and on these 1,600 miles of track in New Jersey 411 passenger trains, carrying at least 25,000 passengers, and 96 freight trains, carrying 4,300 cars of freight run every day. For 24 hours, March 1 and 2, not a train was started from Philadelphia or New York.

The road has 3,100 miles of telegraph wire and 2,916 miles of telephone wire in upper New Jersey, and these carry 7,100 messages every day. In addition, 840 miles of commercial telegraph wire parallel the Pennsylvania tracks, and these carry probably 16,000 messages every day. These 6,856 miles of wire were literally shot to pieces.

The fury of the wind early Sunday evening seemed greater between New York and New Brunswick than farther west. By four o'clock real trouble seemed imminent. Trains were still running, if you would call five and ten miles an hour "running." By five o'clock every overhead wire was laden to the breaking point with its burden of snow and sleet. Many were broken loose by the sixty-mile gale that was raging between Jersey City and New Brunswick.

By 7:30 o'clock Sunday night orders had gone out to start no more trains from New York and Jersey City. Trains left Philadelphia for New York as late as midnight, then everything stopped. The Broadway Limited, the twenty-hour train between New York and Chicago, left New York at 2:45 Sunday afternoon, and it was one o'clock Monday morning before it reached North Philadelphia. The four trains following it in the next hour managed to get through to Philadelphia about seven hours late. The next 13 trains were stalled in the snow at different places.

The first wire trouble occurred early Sunday afternoon, when a street railway wire fell across the high tension wire of the Manhattan division. These wires supplied power for signals and



Thirty-Three Cars, Three Engines

the switches on the Manhattan division at Manhattan Transfer and the lines around Jersey City.

It took only a few hours to repair this damage, but the delay was all the blizzard needed to make its work effective. Poles started to fall, broken by tons of ice. Some sagged and snapped under the weight of the clinging burden; others were carried down by wires similarly laden, and whole regiments fell at a time. The poles fell across the railroad tracks, in many cases blocking both the freight and passenger tracks westbound.

The New York division has a regular storm manual—a book of thirty-six pages. This manual outlines the work every man is to do in case of a snow storm. No orders are given; they are not needed. When it begins to snow every man goes to his place. The first information the book gives is the day and night telephone numbers of the residence and the office of the division engineer. It gives similar information for track supervisors, assistant supervisors and foremen. It tells what their stations shall be when trouble starts. It outlines the duties of the master carpenter and his men; they are assigned to keeping platforms clean. This storm book tells where extra laborers and snow shovelers can be secured, how many men can be obtained at various places, whether they have shovels and other tools, and how many are available at night. It tells where snow plows and flangers are kept; how many laborers can be secured from the different railroad shops. . . .

The superintendent, the engineer of maintenance of way and the division operator were on the job from early Sunday afternoon until late Monday, when the blockade was broken. They sent out train-load after train-load of men, and commissary trains and wreck trains. They kept in touch by round-about long distance telephone wires with Philadelphia.

One of the assistant trainmasters (off duty) heard that the snowstorm was causing trouble out on the road on Sunday, and he made for the railroad station at Elizabeth to do what he could. He didn't return to his office until late Monday night. He was one of the hundreds of employees who didn't sleep for forty-eight hours. His experience was typical.

When he reached Elizabeth he found a freight train bound for Waverly. He jumped on the locomotive, ordered the engineer to uncouple from the train and start for Trenton to help trains in distress. They were destined to find plenty of trouble. They expected to catch up with a gang of laborers just ahead on a work train. The engine stopped at the first track gang work house to get some tools; all they found was an axe.

Just west of Elizabeth they came across seven poles down over both westbound tracks. While the engine crew and the assistant trainmaster were trying to remove these poles others fell over the tracks behind them, making it impossible for them to move in either direction, and it took some hours to extricate their engine from the tangle. All of this time the blizzard was increasing in fury.

When it was evident that he could get no farther on this locomotive, he started out afoot for a light ahead, which he took to be the tower at Millstone Junction. It was about twelve o'clock midnight when he started for the tower. He didn't reach it. After floundering around in drifts, falling time and again, he lost his way; the wind had turned him around many times. He took refuge against the side of a freight car to get out of the wind, but he found it only worse there. For a time he could not see ten feet ahead of him. It was snowing hard and the wind was blowing a gale. Then the storm lifted temporarily, and he saw a light not far distant, and started for it, thinking it to be the tower toward which he was originally headed. He was walking in the wrong direction. When he got close to the light he found it on the locomotive of train No. 69, that had left New York at 3:38 Sunday afternoon. He was almost exhausted and had to be lifted to the baggage car. It was 1:10 a. m. Monday, and he had had no food since 7:30 Sunday morning.

Broken Poles and Wires in Newark

Train No. 69 was running behind a wrecking train which was trying to clear the way. The locomotive of No. 69 and that of the wreck train were almost out of coal. The assistant trainmaster by this time was going at it again. He ordered the men from the wrecker to take coal from cars standing near by on the eastbound freight track. . . .

These trains reached Millstone Junction shortly after one o'clock Monday morning. The engines were supplied with water before they went on their way.

By three o'clock Monday morning the east end of the New York division was covered with work trains, wreck trains, and trains full of laborers from Jersey City. A snow plow was doing yeoman service, bucking drifts here and there as it got to them.

The laborers were shoveling snow and removing telegraph poles as they came upon them. In the cuts these workers were finding drifts four and five feet deep as a regular thing. Fences.

trees, bridges and landscape had temporarily lost their identity in the all-impressive pall of white. It was literally pouring snow.

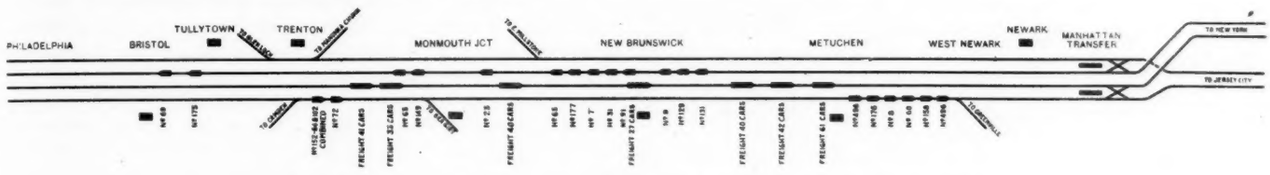
The chief despatcher on duty in Jersey City on Sunday finding the wires down and that he could do no good at headquarters, donned his boots and went out on the road. It was 5:25 p. m. Sunday when he left his office. He boarded a work train, and when he reached West Newark Junction he found a disabled train eastbound and behind it a string of passenger cars a mile long, with their locomotives ready and able to go, but blocked by the disabled locomotive. Six trains were stranded there. But he got two freight engines and, after much jockeying, managed to get the disabled engine out of the way and the freight engines coupled to the passenger train. It took about four hours to do this, but it broke the blockade eastbound.

In Philadelphia the superintendent of telegraph heard of wire trouble early Sunday afternoon. Without waiting for word as to the amount of damage, he asked for work trains and linemen from Altoona and from the Lines West of Pittsburgh, 400 miles away. He ordered a thousand miles of wire and a thousand poles; he didn't know three thousand miles of wire were down, that 480 poles had been snapped off as if they had been match sticks, and that two thousand cross-arms had been torn from poles by the wind's fury. One of the first things he did was to lease a telephone wire from the Bell Telephone Company.

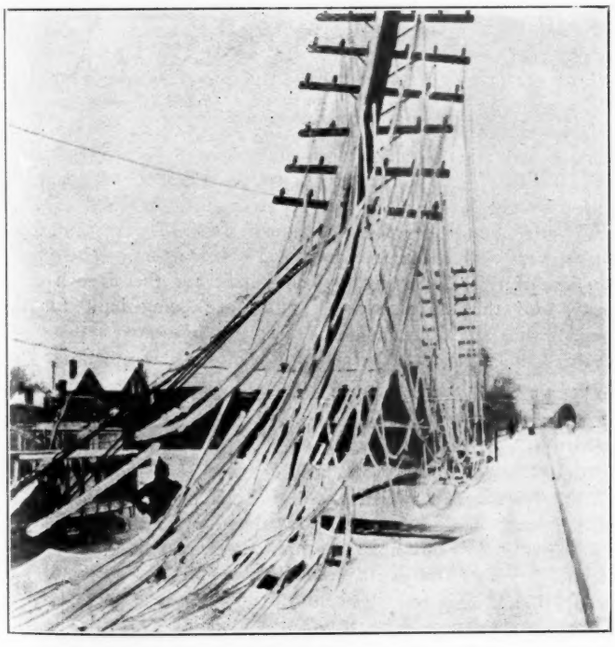
Harrisburg sent 300 men; Altoona sent 300 on the first order and 500 later Monday morning. Other gangs came from Pittsburgh and Baltimore. Work trains from Renovo, 250 miles away, and from Sunbury, with crews trained to fight blizzards, were rushed to the scene of trouble. These two gangs proved invaluable, as they came with camp trains fitted with enough supplies to be out four days. From Philadelphia train-loads of snow shovelers were despatched as fast as they could be obtained by contractors. By noon on Monday there were no less than five thousand extra men shoveling snow between Jersey City and Philadelphia. As a brakeman put it when he saw a thousand men attack a huge drift near Bristol, "There are enough men out there to eat it."

Nine o'clock came on Monday morning and not a regular westbound train on the New York division was moving, except those that were already out and stranded. Sometimes they managed to creep a few feet. The stranded eastbound trains managed to crawl into Manhattan Transfer and New York after the despatcher pulled the disabled locomotive out of the way. Eight passenger trains were stalled near New Brunswick and Millstone Junction; seven freight trains were held up between Jersey City and Philadelphia.

But the work of the wreckers and snow plows and thousands of men was telling fast. . . . By noon on Monday they had



Locations of Stalled Trains on the Pennsylvania Railroad, March 2, 1914



Tons of Ice

A convoy of trains at Monmouth Junction Sunday night consisted of No. 63, the New York and New Orleans Limited, No. 149, two-hour express from New York to Philadelphia, and No. 23, the Chicago Limited. They got into Trenton, but had a hard time doing it. Water in the engines of both 63 and 149 gave out, and it was necessary to extinguish the fires. That meant that the trains could not be kept warm.

A train despatcher was on his way to Philadelphia on No. 63, while the superintendent of one of the divisions of the Pennsylvania was on No. 149. They did not know each other before that night, but it was not long before the superintendent was busy with the despatcher as his helper. They took two Trenton division engines that were standing at Monmouth Junction. Uncoupling them from a freight train, they ran them around the switches at the Junction until they got them behind No. 149, but even these two engines could not budge the stalled trains. A wreck train arrived behind the two locomotives, and it was coupled on. . . . This was about nine o'clock Monday morning. The despatcher gave orders to the engineer to disregard all signals except those controlling switches. It was utterly impossible for the engineer of No. 63 to see signals fifty feet from his cab, so the despatcher climbed out on the running board and held his post all the way to Trenton, repeating signals back to the engineer in the cab. It took two hours for this strange train—two full trains with dead locomotives, two other engines and a wreck train—to get to Trenton, a distance of ten miles. Fortunately the freight locomotives could supply steam to keep the passenger trains warm.

Many of the shovelers were poorly clad, with no gloves, and suffered intensely. The cold was so extreme they couldn't stay out of doors long at a time. Dozens of laborers had their ears, hands and feet frozen. But the railroad had to be opened. A conductor had his eyelids almost frozen, so intense was the cold. He was in charge of a train carrying a gang working on the road near Bristol. Most of the men on this train were foreigners, and every time they turned out to shovel snow the conductor went also. He wanted to be sure a train did not run over some of them.

Practically all of the branch lines managed to keep open during the storm Sunday and Monday. On Monday while New York and Philadelphia were undertaking in every way to obtain some means of communication along the division, it was found

possible to reach Princeton over the long distance telephone. The importance of the Princeton branch increased 100 per cent. that morning, for by using a locomotive as a messenger between Princeton and Princeton Junction, the agent at Princeton could keep Philadelphia and Jersey City advised as to the trains that passed Princeton Junction. All day Monday and Tuesday the Princeton agent sent in these reports, and they proved invaluable in keeping in touch with trains out on the division.

FEEDING 7,300 MEN

Feeding for three days 5,000 extra laborers and 2,300 regular men, stretched out over ninety miles of railroad with no means of communication, proved a task the doing of which was another of the seemingly impossibles accomplished. At Philadelphia the engineer of maintenance of way had charge of the commissary. The restaurant at Broad street station was kept open all Monday night, and more than sixty thousand meals were sent out on special trains to feed the men along the road. The same thing was done at Jersey City. Commissary trains were sent out as fast as food could be prepared. The first train that left Broad street station, Philadelphia, on Monday took 8,000 meals; the next one carried food enough for 20,000 meals. Those in charge of these trains had orders to feed every man they came to and see that all had plenty of hot coffee.

In addition to the commissary trains, track supervisors at Tacony, Trenton, New Brunswick and Jersey City supplied laborers with food bought from nearby restaurants. Sandwiches and coffee comprised the menu of most of the hundred thousand meals the railroad served to its forces between Sunday and Thursday.

THE PASSENGERS

When Monday morning dawned, the Pennsylvania Railroad had nearly two thousand passengers marooned on eighteen trains stretched out between New York and Philadelphia. A representative of the Pullman Company who lives at New Brunswick went through the trains there on Monday morning. He found the passengers making themselves comfortable and taking the delay philosophically.

Fortunately, many of the marooned trains carried dining cars, where passengers could obtain food. The engineer and fireman of one train that had only a buffet car dug a path to the train ahead, so that the passengers could get to the dining car of that train. All meals beyond those regularly served for a train on time were supplied free. In the neighborhood of New Brunswick there were nearly a thousand passengers to be taken care of. The agent told the conductors not to allow any fires to be drawn, and then he got from the city fire department ten lengths of fire hose, which was attached to city plugs, from which the tanks of the locomotives were supplied with water.

When trains from New York reached Trenton Monday noon, the passengers were sent to Trenton hotels as guests of the railroad. On the Congressional Limited, one of the stalled westbound trains, the dining car was kept open all night, and the supply of food ran very short. Several of the passengers gave their breakfasts to the flagman and other employees who were endeavoring to tear away fallen wires around the train.

The officers at Pennsylvania station in New York knew Monday that they had a record-breaking situation to deal with, and they lost no time advising passengers having New York hotel or residence addresses to leave their telephone numbers with the station master and return to their homes to wait the departure of trains in comfort. The passenger department arranged to extend the limit of all tickets which, due to the blizzard, could not be used before their time limit expired.

Eight hundred people slept in Pullman cars in the station Sunday night. One man woke up believing he was in Pittsburgh. Two thousand five hundred people remained in the trains and the station Sunday night. Among these were members of 22 theatrical companies. The Pullman Company redeemed six hundred dollars' worth of Pullman tickets Sunday night in New York.

REPAIRING THE WIRES

By noon Wednesday gangs of linemen had temporary wires up from Trenton to Cornwells and from Jersey City to Elizabeth.

On Tuesday and Wednesday wiremen were obtained from every possible source. They were sent out in gangs of twenty on special trains of dining cars and sleeping cars. Fourteen such trains were put on the road from Jersey City, and they are still out making permanent repairs [March 18]. In addition, trains of sleeping cars and dining cars were sent out each night from Philadelphia to take up any linemen and give them accommodations for the night. The linemen have a tedious job ahead of them. They must unravel a tangle of three thousand miles of wire. It will take a month to do it, and it will cost a lot of money. The new copper wire alone ordered up to Wednesday following the storm cost $60,000.

By Monday night all the snowed-in trains had started on their way, most of them just twenty-four hours late. On Tuesday morning trains were compelled to run slowly, as the despatchers had great difficulty in getting orders to them. The despatchers had been dropped by work trains at stations along the road to direct the movement of passenger trains in person, until wires could be repaired. These men were of no use in Jersey City without telegraph wires, and the division officers knew it would be the latter part of the week before the wire system could even be temporarily repaired.

Tuesday evening trains were leaving their terminals on time and arriving from an hour to two hours late. Wednesday morning they were only a few minutes late going over the New York division, and by Wednesday night they were on time, and all of this with practically no wires. The train despatchers at Newark, Perth Amboy Junction, South Elizabeth, Monmouth Junction, Trenton, Cornwells and North Philadelphia kept in touch with the trains on the road as best they could and gave their train orders verbally. Underground long distance telephone wires were used for communicating between New York, Jersey City and Philadelphia. Complete freight service was resumed Thursday, March 5.

THE RAILWAYS OF ECUADOR.—At the end of the year 1912 there were 396 miles of railroad in operation in Ecuador. Of this 288 miles were operated by the Guayaquil & Quito Railway, an American company, 48 miles by the Compagnie Francaise de Chemins de Fer de l'Equateur, a French company, 36 miles by the Central Railway of Ecuador, an English company, and 24 miles by the government itself. At the same time there were 423 miles in course of construction. The larger portion of this, 249 miles, is being built for the French company. Of the remainder, 93 miles are being built for the municipality of Guayaquil, 73 miles for the government and about 8 miles for the Central of Ecuador. The government is also proposing to build 440 miles of new line.

RAILWAY ELECTRIFICATION IN ITALY.—The Italian state railways have recently made a contract with the Italian Westinghouse Company of Lado Liguria for the electrification of the 27 mile line between Genoa and Savona, which forms a part of the complete line between Genoa and Marseilles in France. The work is to be completed within three years. Work on the electrification of the line between Savona and Ceva has already been begun. This line is about thirty miles long and forms a part of the railway between Genoa and Turin and other points in the extreme western part of Italy north of the Maritime Alps. This line will have been completed as far as San Giuseppe, a distance of eleven miles, by June 1. It constitutes one of the principal thoroughfares for the coal carrying freight of northern Italy. Electricity will be utilized both for the freight and passenger service, and the electric locomotives to be used are the same as are now in use on the Italian railways from Genoa through Apenines and the Giovi, which were made by the Italian Westinghouse Company and operate with a three-phase alternating current.

New Norfolk & Western Coal Pier at Norfolk, Va.

Unusual Combination of New and Old Features in the Largest Coal Shipping Dock on the Atlantic Coast

A new pier with a maximum rated capacity for loading 90 tons of coal per minute into vessels has just been added to the Norfolk & Western trans-shipment plant on tide water at Lambert's Point near Norfolk, Va. This capacity is about three times that of pier No. 3 at the same point which had the highest rating on the Atlantic seaboard until the completion of the new dock. The old pier is a power incline type in which road cars are pulled to the top and dumped directly into the bins at a maximum rate of 40 per hour. On the new pier special transfer cars into which can be dumped two road cars of any but the largest size are raised to the pier deck on elevators. It was estimated that these cars could be handled at the rate of 60 per hour, but a maximum speed of 34 cars per hour has already been attained with one dumper in operation, and the indications are that this rate can be increased to almost 40 cars per hour for one dumper, thus materially increasing the capacity over the estimate. This combination of a mechanical car dumper and a gravity pier has been used in the Virginian dock at Sewall's Point in the Norfolk harbor, but the elevators for raising the dock cars to the pier deck are used for the first time in the new Norfolk & Western design.

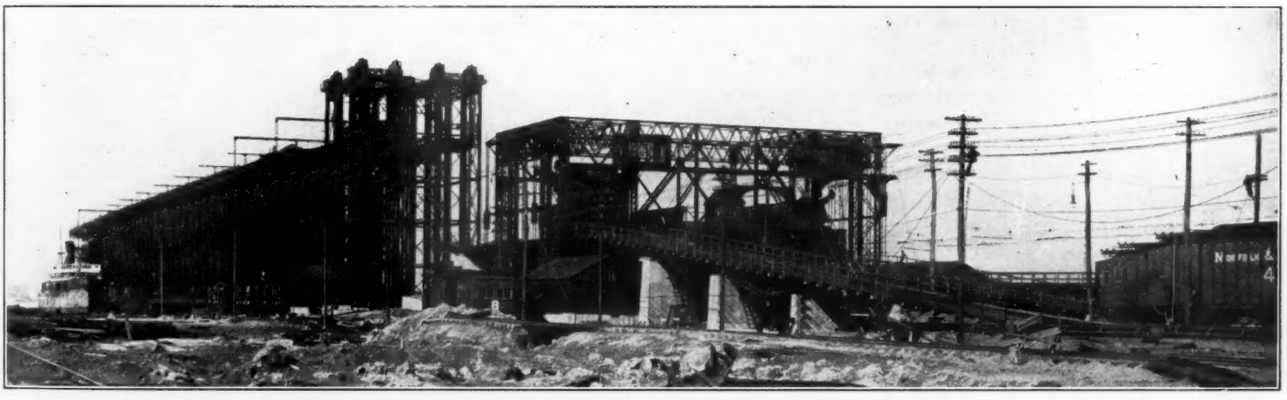
GENERAL ARRANGEMENT

The Lambert's Point terminal included three coal piers and two warehouses served by a large receiving and classification yard with an engine terminal and car repair facilities located north of the yard. The new pier, known as No. 4, replaces No. 1 and is located north of the old ones. As the engine terminal and car shops occupied property needed for the approaches to the new pier, these facilities were first replaced south of the main yard. In connection with this work the yard was enlarged to a capacity of about 3,500 cars and the spacing between tracks was widened from 12 ft. to 13 ft. New load and empty yards serving only the new pier were built just north of the main yard, the former having 12 tracks with a total capacity of 414 cars, and the latter seven tracks with a total capacity of about 525 cars.

The Norfolk & Western handles about 46 per cent. of all the coal delivered to vessels in the Norfolk harbor. This coal is received from a large number of mines on the company's lines in the Pocahontas fields in West Virginia and is delivered to all classes of vessels from bay craft requiring less than 50 tons up to the largest government colliers of about 12,500 tons cargo. An average of about 400 cars per day is received at the Lambert's Point terminal, usually in 55 car trains. These loads are first classified in the main yard according to the grade of coal and the consignee, requiring a total of about 40 classifications and sometimes as many as 15 to 20 in one train. The classified loads that are to pass over the new pier are then set in the new load yard. The approach to this yard rises on a 1.3 per cent. grade for 600 ft. and the remainder of its length to the scales, 1,735 ft., is on a descending 1 per cent. grade, so that the loads require no handling by locomotives after being set over this summit.

The loaded cars are dropped down over the scales under the control of riders, and then on a 1.5 per cent. grade to one of the two "barney" pits from which they are pulled up an 11 per cent. power incline to one of the car dumpers. After the coal is dumped from the road cars to the special dock cars, the former are pushed off of the dumping platform by the next car coming up the incline and drift by gravity down grades of 2 per cent. on one side and 2.34 per cent. on the other, to switchbacks, from which they descend on 1 per cent. grades to the empty yard. No classification of empty cars is necessary, and the length of each track in this yard is made sufficient to assemble a full road train of 75 cars.

After being loaded, the electrically driven dock cars move under their own power from the dumper to elevators which raise them to the pier deck. The cars then move again under their own power along the level grade on the deck to the desired bin, dump their load and then move to the outer end of the pier, where they take a crossover to the center track and descend under brake on a 6.25 per cent. incline to the dumper.



General View of the New Pier, Elevator, Car Dumper and Barney Incline After the Plant Was Put in Operation

The coal dumped into the pier pockets is held by gates until it is desired to chute it into boats anchored alongside. The pier is unusually high, 90 ft., making it possible to deliver coal at any height between 5 ft. and 47 ft. above high water. The slip on each side of the dock is 1,200 ft. long and 160 ft. wide at the bulkhead, allowing four of the longest boats to be loaded at one time.

CONSTRUCTION OF YARDS, SCALES AND CAR DUMPER

The slips and pier site were dredged to a depth of 32 ft. to 34 ft., and the material, which amounted to about 680,000 cu. yd., was used for filling back of the bulkheads. A 22 in. suction dredge was used for this work, pumping through a pipe line which was 3,000 ft. long at times and elevated the material about 15 ft. above low water. This outfit handled from 160,000 to 180,000 yd. per month. On account of the nature of the fill back of the bulkhead, a special type of timber construction was adopted along the ends of the slips. The ordinary bulkhead construction was reinforced by tying it at intervals of 8 ft. with 1¼ in. rods

to a row of 40 ft. piles braced by 30 ft. piles driven on a batter of 4:1.

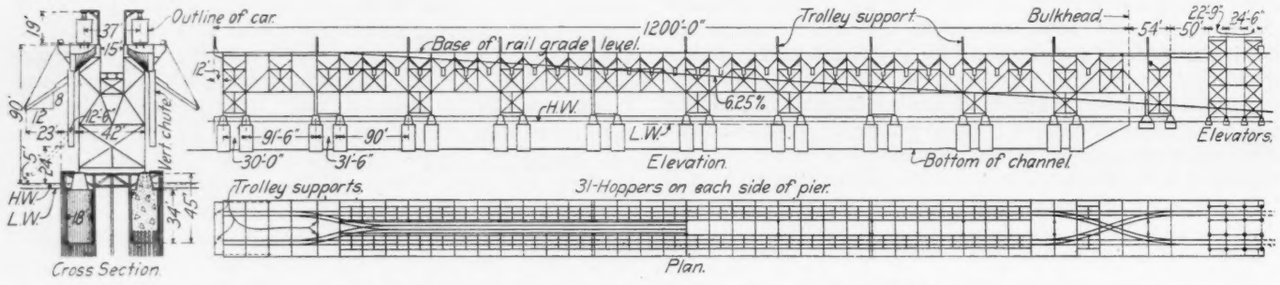
The empty yard was laid on the original surface, but the load yard required a fill of 250,000 yd., which was made by company forces, the material being hauled from borrow pits near Suffolk, about 25 miles west. The new yards and the pier tracks are laid with 100-lb. rail. The two new scales are similar to one already in service which was designed by the company's engineering department and furnished by Fairbanks, Morse & Company. These scales are 68 ft. long, have a rated capacity of 200 tons and are fitted with an automatic weighing device. Every load is weighed as it passes to the pier, but dead rails are provided for engine movements.

The "barney" is a small car on an endless cable operated by two 225-h. p. motors. It runs on a narrow gage track between the main track rails, extending down into a pit at the bottom of the incline in which the car is below the track level. As soon as a road car passes over the pit the barney is pulled up to engage its rear and push it up to the dumper.

The Hulett dumper is a double machine, each side having a capacity for turning 30 cars per hour. The road car tracks on the dumper are 77 ft. 9 in. apart, allowing three dock car tracks to be carried between them. The road cars are turned inward to dump into dock cars on the adjacent tracks, the middle track being used for empty dock cars returning from the pier. The dock tracks are on the ground level, and the north dumping platform on which the road cars are run is about 15 ft. higher to make it possible to dump the cars without raising them in the machine. The south dumping platform is about 22 ft. above the adjacent dock track on account of the necessity for carrying the track leading from this platform over the dock tracks to reach the switchback which returns the road cars to the empty yard. The steel frames supporting the two dumping machines are tied together by latticed girders over the dock tracks, and the structure rests on heavy concrete footings tied together by reinforced concrete struts, the whole substructure being supported on piles. The dumpers are operated by 500-volt d. c. motors located in machine houses on each side of the frame. Both the barneys and the dumpers are controlled from an operator's house on the bridge between the two machines. The barney tracks are carried up to the dumping platforms on deck girders supported by concrete piers. The tracks leading from the dumpers to the switchbacks and then to the empty yard are laid on timber trestles with the exception of the crossing of the dock tracks, which is made on through girders with transverse I-beam floors.

CONSTRUCTION OF ELEVATOR AND PIER

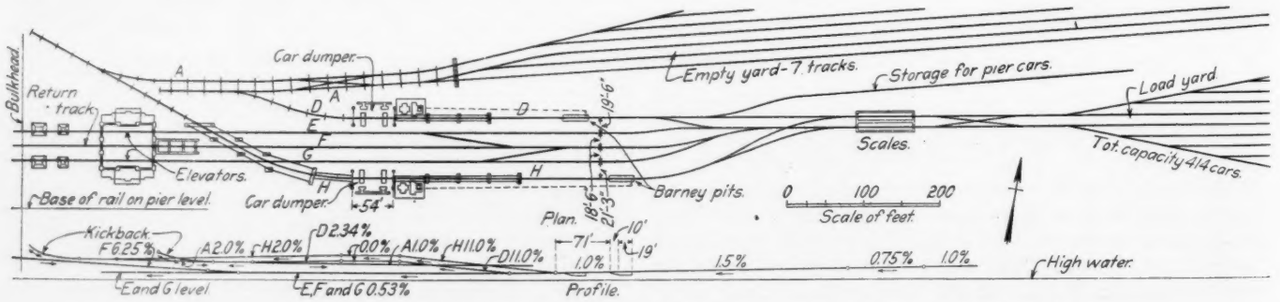
The two elevators, having a lift of about 82 ft., are operated in steel towers about 110 ft. high, resting on a 4 ft. concrete slab reinforced with old rails and supported by about 50 piles, 50 ft. to 80 ft. long. Concrete pedestals were built on the slab under each column. The elevators are counterweighted to equalize the unbalanced load for the up and down movements, reducing the force necessary to raise a loaded dock car to about 175,000 lb. There are six 1¼ in. cables on each corner of each elevator for the counterweights and operation. The motor equipment consists of four 500-volt, 600-h. p. d. c. motors for each elevator. The machinery is housed at each side of the tower at the bottom, and the control house is located on top. The girders from the elevator towers to the end of the pier are movable so the elevator coming up can engage their ends and bring the track into the proper position, allowing the dock car to move off as soon as the elevator stops, and eliminating the necessity of extreme accuracy in stopping the elevator.



General Details of the New N. & W. Pier No. 4 at Norfolk, Va.

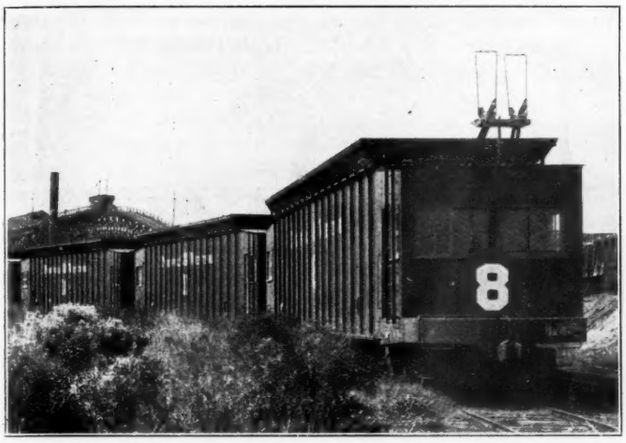
The pier is a steel viaduct structure supporting the two level dumping tracks and the one inclined return track, the hoppered bins and the chutes. The substructure consists of two rows of steel cylinders spaced 42 ft. center to center, which are filled with concrete and enclose the heads of supporting piles. On these cylinder piers are carried the steel bents of the superstructure, the spans being alternately 30 ft. and 90 ft., with tower bracing in the 30 ft. spans.

After the dredging had been carried down 32 ft. below low water, a cluster of 64 piles was driven at the site of each pier with a No. 1 Vulcan steam hammer and follower, the elevation of the pile cutoff being 27 ft. below low water. These piles were driven to carry 40,000 lb. safely, and 30,000 lb. was taken as the supporting power in the design. Steel cylinders of ¼ in. plate, 18 ft. in diameter, were then set over the piles and braced in position by the timber fenders. These cylinders were 41 ft. high, the lower edge being 3 ft. below the bottom of the channel and 8 ft. below the tops of piles and the top edge 3 ft. above high water. Concrete was placed in these cylinders under water up to the tops of the piles with a bottom drop bucket. After they



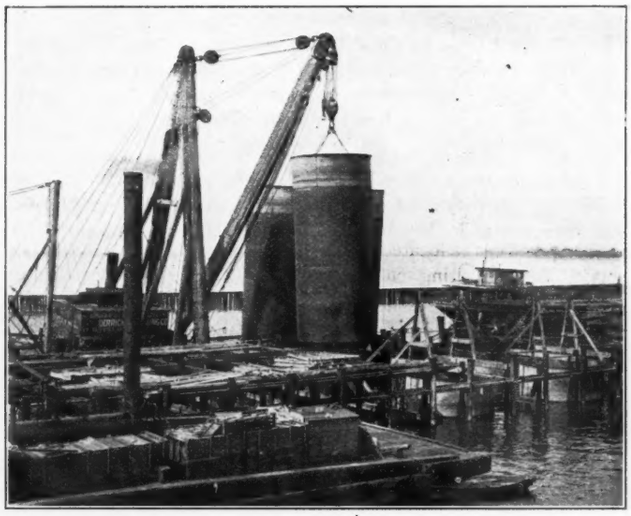
Plan and Profile of Dumping Plant and Approach Track to the New Dock

had been sealed in this way each cylinder was pumped out, cleaned and filled with concrete up to an elevation 1 ft. below low water. Pedestals 11 ft. high were then built on these cylinders to carry the steel bents. The concrete was placed from a barge mixing plant and was spouted directly to place from the mixer. The upper 7 ft. of the steel cylinder which served during construction to keep the top edge above high water level was removed after the substructure was completed. The fender piles, waling pieces and chuck blocks are of creosoted timber, the tops of piles and all daps in these timbers being given two coats of hot tar.



The Self-Propelled Dock Cars

The pier framework and heavy members of the chutes were erected by a large traveler with two 90-ft. booms, a smaller traveler being used to follow up and place the bins, track girders and other small members. The steel was brought to the bulkhead on cars, where it was loaded on barges and carried out to place. The maximum progress in the erection of the superstructure was about 120 ft. per week. The pier, elevator and car dumpers contain about 9,000 tons of steel and required the placing of about 20,000 yd. of concrete.



Placing the Cylindrical Steel Forms for Footings Under the New Pier

The pier structure is divided by four expansion joints, two bents 3 ft. apart being used at each of these points. The bins which are supported by the framework are arranged in two rows of 31 on each side with a track over each row. The top opening of these bins is 30 ft., the full length of the panel, made

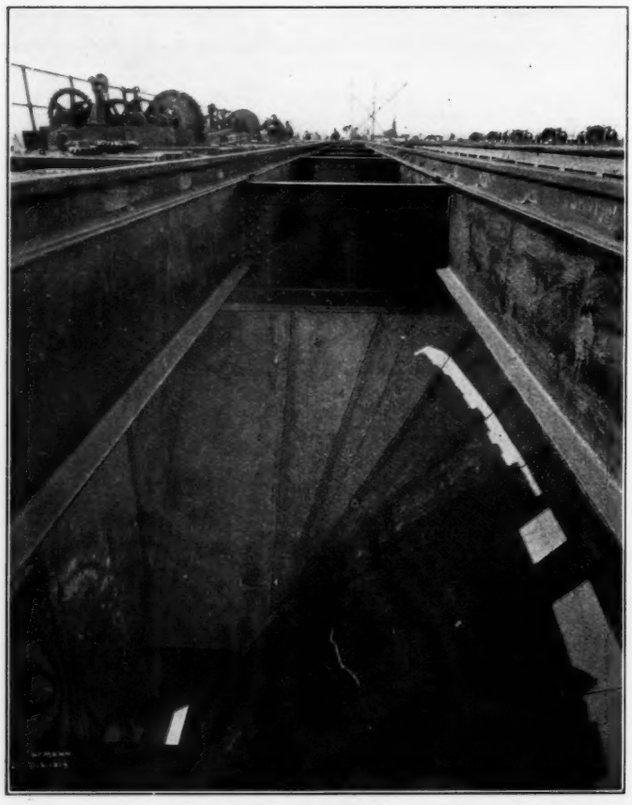
A Side View of the Pier Nearing Completion

necessary by the fact that the dock cars have a bottom opening of 26 ft. The capacity of each bin is 4,800 cu. ft., while each dock car holds 3,900 cu. ft. The front of the hoppers are vertical and the backs are pyramidal, eliminating the square corners in which coal is likely to become lodged. Fixed vertical chutes and adjustable inclined spouts convey the coal to the vessels. The minimum slope of these spouts for free running is 8 in. per ft. Hand winches located on the deck of the pier are used to control the elevation and inclination of the spouts. A double crossover on the pier deck near the elevator allows a car brought up on either elevator to reach any desired bin.

ELECTRIC EQUIPMENT

Electric power is used throughout in the operation of the pier, and manual labor has been eliminated wherever possible. A brick substation is located near the scales in which the 3-phase, 11,000-volt alternating current received from an electric interurban line is transformed to 424 volts in two 1,000 k. v. a. transformers and used in two 1,000-k. w. rotary converters to produce 600-volt direct current for use in the motors at various points about the plant. This current is transmitted from the substation to the pier on a pole line which also feeds a trolley line located over all dock car tracks.

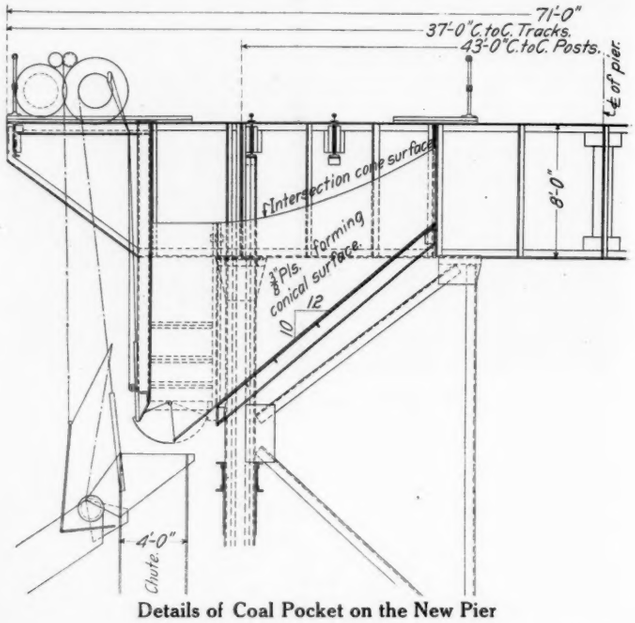
The 12 dock cars have a load capacity of 220,000 lb. of coal,



Interior of One of the Pier Bins Showing Rounded Corners

the weight of each car being 116,000 lb. They are mounted on two 6-wheel tracks with a total wheel base of 60 ft. and an over-all length of 64 ft. Each car is propelled by two motors, one geared to one of the axles on each truck, these driving axles being connected to the others by connecting rods. The motors are wired for 500 volts and are rated at 50 h. p., giving the cars a speed rating of 900 to 1,000 ft. per minute loaded, and 1,200 to 1,400 ft. per minute empty. The current is collected from the trolley wire by a pantagraph.

This work was started under the general direction of Charles S. Churchill, chairman, valuation committee, formerly chief engineer; the design was made under the direction of J. E. Crawford, chief engineer, formerly bridge engineer, and C. C. Wentworth, principal assistant engineer, and the work was carried out under Mr. Crawford's direction. W. P. Wiltsee was assistant engineer in direct charge of the work. The work was begun about July, 1912, and the pier was placed in operation December 24, 1913. The contractor for the construction of the bulkhead, the dredging and the pier and elevator foundations was Henry Steers, Inc., New York; the foundations for the car dumper, the approach and return tracks, the scales and the substation were built by J. P. Pettijohn & Co., Lynchburg, Va.; the superstructure of the car dumper, the machinery for the elevators and the pier cars were furnished by the Wellman-Seaver-Mor-

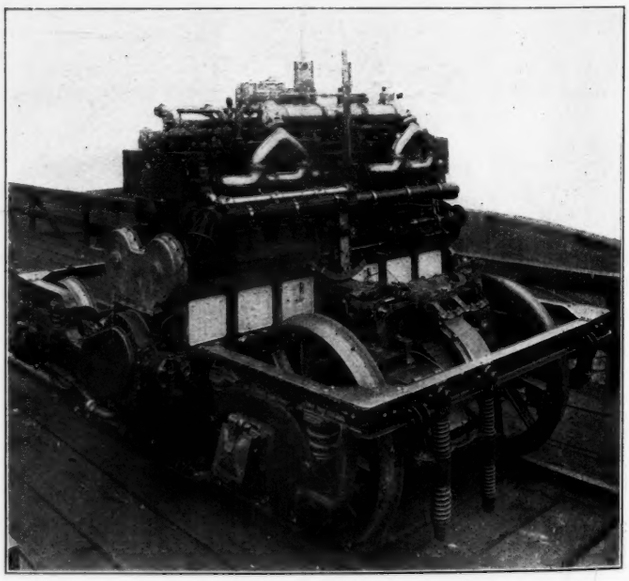


Details of Coal Pocket on the New Pier

gan Company, Cleveland, O. The Virginia Bridge & Iron Works, Roanoke, Va., fabricated and erected the steel framework for the elevators and pier, the bunkers and the chute boxes; and the Link-Belt Company, Chicago, furnished the chutes and operating machinery. We are indebted to the engineers in charge for the above information.

SUNSET CENTRAL MOTOR CARS

The McKeen Motor Car Company, Omaha, Neb., has recently delivered to the Sunset Central Lines some gasolene motor cars of its type C model. These cars weigh 78,000 lb. and are pro-



New Type of McKeen Power Truck

vided with six-cylinder gasolene engines of 200 horsepower. The engines are started by air and are reversible. The seating capacity in the passenger compartment is 54; in the smoking compartment, 29, making a total of 83.

These cars contain the latest improvements in McKeen motor car trucks, which are designed to reduce the maintenance cost. The new features have been carefully studied dusing the past nine years, and are a result of investigations of cars that have been in service on various railroads. A seven-year-old car, running 5,000 miles per month, earning $117 per day, has been operated at a cost of 14 cents per mile.

The new cars are provided with cast steel side frames cast in one piece. The wheels and axles are the M. C. B. standard, and the driving boxes are such that they may be removed without dropping the wheels. All the machinery and moving parts are enclosed in oil-tight, dust proof casings and housings. The crank shaft, cam shaft, bearings, rods, air pumps, water pumps, etc., are automatically lubricated by a circulating oiling system. An auxiliary hand oiler is located between the cylinder units so that the motorman may oil the crank and rod bearings every five seconds, thereby facilitating the lubrication when starting on a cold morning. The water space around the valves and cylinder heads has been increased to permit overloading the engine. The manifold pipes are water jacketed by means of which the gases are heated and equally distributed to the different cylinders. The valves are made of tungsten steel. Piston rings of special design have been installed to provide the necessary compression when the cylinders become worn.

A multiple disk friction clutch has been developed with an increase in the number of friction elements, which gives more positive action and greater efficiency. The speed gears of the transmission have been increased in strength. The herringbone type gear is used instead of the involute spur gears. The whole mechanism of the truck has been simplified and the number of parts reduced, which gives greater reliability and freedom from accident. The wearing surfaces of the new power truck have been generally increased from two to six times.

The following are the general dimensions of these cars:

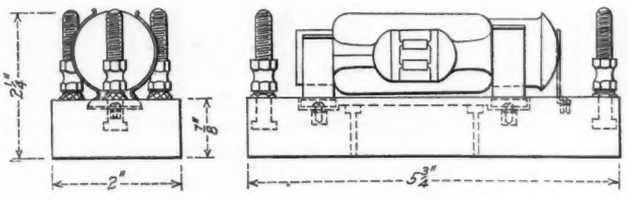
Weight of car in working order	78,000 lb.
Length over end sills	70 ft.
Length of engine compartment	13 ft. 8 in.
Length of baggage compartment	8 ft. 6 in.
Length of smoking compartment	16 ft. 4⅛ in.
Length of passenger compartment	28 ft.
Height from top of rail to top of car	11 ft. 9 in.
Height from floor to ceiling at the center of the car	7 ft. 5⅝ in.
Total seating capacity	83

A similar car has been made for the Bessemer & Lake Erie, but the car for this road is shorter and lighter, its total weight being 68,000 lb. The baggage compartment is equipped with collapsible benches for emergency use, which increases the seating capacity by 18 passengers, giving a total of 66 passengers. These cars are 55 ft. 2 in. long over the end sills.

McKeen Gasolene Motor Car for the Sunset-Central

THE VAC-M LIGHTNING ARRESTER

The drawing given herewith shows the construction of a new type of lightning arrester, which has been brought out by the National Electric Specialty Company, Toledo, O. The carbon electrodes are enclosed in a vacuum glass container with terminals brought out and connected with suitable binding posts, the two binding posts for the line being on one end of the base and the single post for the ground on the other end. The clips which hold the cartridge are made of phosphor bronze, to best withstand adverse conditions of atmosphere. The cartridge is 1¼ in. in diameter and is removable. The electrodes are mounted on a ridged porcelain disk.



The Vac M Lightning Arrester

The National Electric Specialty Company's lightning arresters are in use on the New York Central, the Chicago, Milwaukee & St. Paul and other roads. One of these arresters is reported to have afforded complete protection to telegraph instruments during a cross, with a line carrying 2,300 volts, which lasted for eight hours. In another case a cross with an electric light wire, on which was a current of 6,600 volts, was sustained with a similar favorable result.

The arresters are extremely sensitive, while at the same time the gap between the electrodes is so wide that there is no trouble from grounds.

RAILWAY IMPROVEMENT IN ARGENTINA.—The Buenos Aires Great Southern is now engaged in double tracking its line along the east coast of the Argentine Republic south from Buenos Aires from Plaza Constitucion to Mar del Plata. The second track has already been laid to Altamarino Junction, 55 miles south of Buenos Aires. Work has also been started from Dolores, at the middle of the line, toward Mar del Plata.

General News Department

The Illinois Central has taken out a building permit for a hospital at Fifty-eighth street and Stony Island avenue, Chicago, to cost $400,000.

A bill has been introduced in Congress to permit newspaper publishers to enter into contracts with railroads for advertising, to be paid for in transportation.

The arbitrators who decided the wages of conductors and trainmen last November are again sitting in New York City to listen to complaints made by the brotherhoods against a number of railroads.

At Bakersfield, Cal., March 16, Maurice Rice, 17 years old, rode a mile on a motorcycle in 51 seconds, doing the feat on a "dirt track." On the same track Rice has ridden his machine 67 miles in one hour.

A tract of 20 acres of land in South Portland, Ore., valued at approximately $100,000, has been presented to the state by the Oregon-Washington Railroad & Navigation Company as a site for the medical college of the University of Oregon.

In Maryland a law has been enacted requiring railroads to grant two days off each month to telegraphers, block signal operators and all signal men. The Baltimore & Ohio has closed a number of telegraph offices at small stations.

The government has brought suit against the Boston & Maine in the Federal Court at Boston to recover penalties for violations of the hours of service law; of the safety appliance law and the 28 hour law regulating the transportation of cattle.

The Southern Pacific's new ferryboat *Alameda* is now in service between San Francisco and Oakland, the largest and fastest boat on the bay. This vessel has seats for 1,845 passengers. It is 292 ft. long and its breadth, amidships, is 42 ft.

Following unsuccessful efforts at conciliation by Judge Chambers, who last week went from Washington to Augusta, the Georgia & Florida has agreed with its enginemen and firemen to submit to arbitration their demand for an increase in pay.

G. P. Conard, secretary of the Association of Transportation and Car Accounting Officers, announces that the June meeting of the association will be held at Atlantic City, N. J., on Thursday and Friday, June 18 and 19. Headquarters will be at the Hotel Chalfont.

The Bureau of Standards, Department of Commerce, Washington, announces that next month the bureau will be ready to test and adjust watches, carrying on the tests through a period of 54 days. For a test under Class A, the most thorough test, the charge will be $5; other tests $3.

The American Telephone and Telegraph Company and the Western Union Telegraph Company have submitted to fines amounting to $50,000 in the state of Mississippi for violation of the anti-trust law of that state; and the telephone company has divested itself of ownership in the Western Union.

The Baltimore & Ohio has issued a comprehensive code of rules to crossing watchmen, defining their duties. The watchmen report to the track supervisors and are required to undergo an examination as to operating rules, signals and schedules. The watchmen are furnished uniform caps, with their occupation displayed on a metallic plate.

On the Monongahela division of the Pennsylvania last week 15 freight train crews in yards left their work because, it is said, one man had been taken off from each crew. It is said that the officers of the brotherhoods disapproved the strike and that it quickly failed; but according to some accounts there was a good deal of disturbance of freight traffic.

The New York Central has applied to the New York State Public Service Commission, Second district, for relief from the law which requires it to use oil fuel in locomotives in the Adirondack forest preserves. Operating expenses were increased, in one year, by the use of oil, in the sum of $106,201. The road declares that with suitable precautionary measures it will be safe to use coal.

E. H. Morton, Greenwood, Mass., president of the Order of Railway Station Agents, an association which has flourished mainly in New England, announces that he is going to start a "nation-wide" movement for a station agents' organization. Mr. Morton's association, now seven years old, has 2,000 members. He says that it is not a radical body. It is designed principally for the benefit of bonded employees.

In the Canadian parliament March 21 there was introduced an elaborate new railroad bill providing for more complete regulation of railway matters by the railway commission. This proposed law includes many or most of the radical provisions of similar laws recently adopted in New York, Pennsylvania, Illinois and other American states. Certain important duties now devolving on the Minister of Railways are transferred to the railroad commission.

The large coal pier in the Curtis Bay export terminal of the Baltimore & Ohio at Baltimore is to be equipped with automatic telescopic chutes, to prevent the breakage of coal in loading from the cars into vessels. The automatic chute will be attached to the end of the pocket through which the coal passes when leaving the car, and, being adjusted to an easier angle, will neutralize the force of gravity. The chute is collapsible, like a folding drinking cup. It is also planned to try a spiral chute, designed likewise to eliminate breakage of coal.

Whether a railroad company can be held liable for penalties possibly incurred by trains operated by lessees and not by the company itself will be a chief point to be considered in the case of the state of Texas against the Beaumont & Great Northern and the Missouri, Kansas & Texas for $8,400,000 penalties because of alleged failure to have electric headlights and automatic couplers on trains operated on the Beaumont & Great Northern. The railroad has made lease contracts whereby lumber mill owners run logging trains over the road, and the violations are said to have been made by these lessees.

The new Chicago freight terminal of the Minneapolis, St. Paul & Sault Ste. Marie at Twelfth, Canal and Clinton streets, will be opened for business on April 1. The terminal has an outbound freight house track capacity of 140 cars, inbound freight house capacity of 100 cars, team track capacity of 300 cars, 125 receiving and delivering doors and 35 acres of working space. A description of the design and construction was published in the *Railway Age Gazette* of August 22, 1913, page 321. The company entertained a large number of railroad men and shippers with a luncheon and inspection of the terminal on March 26.

The Southern Pacific has for some months been running a lunch car on its main line through the San Joaquin Valley in California. Recently a new type of lunch car has been put in service on the line extending southward from the main line at Hazen, Nev., to Goldfield. To accommodate women, the counter, which runs the full length of the car, has been made lower. This car is said to be very popular. It runs on train No. 23 leaving Mina, Nev., at noon and reaching Sparks at 7:28 p. m., and returns on train 24, leaving Sparks at 9:50 p. m., and arriving at Mina at 5 a. m. These trains are run over the main line between Hazen and Sparks, 42 miles.

In the Federal Court at Louisville on Monday arguments were heard in the suit of the government to compel the Louisville & Nashville to open its correspondence files to the examiners sent out by the Interstate Commerce Commission to investigate the road's relations with various other railroads. Counsel for the government argued that authority for examination of the records was given in the act of August, 1906. The railroad attorneys contended that the government sought to make the law retroactive in demanding access to records dated prior to the passage of the law. They also contended that the corre-

spondence in question was privileged, as communications between officers of the company and its attorneys. On Wednesday Judge Evans overruled the government's motion. He held that the law does not give the commission power to make a general examination, and that the proposed examination is not along lines specific enough to enable the court to determine whether or not it is legal.

The *Western Electric News* reports that on the lines of the telephone and telegraph companies in the storm-stricken districts of New Jersey (March 1 and 2) over 6,000 poles went down and these on lines carrying the heaviest loads in the country. Following is a summary of emergency shipments: One hundred and fifty carloads of poles, weighing 13,000,000 lb.; 16,000 miles of wire, weighing 2,300,000 lb.; 14,000 crossarms, weighing 750,000 lb.; 50 miles of cables, weighing 270,000 lb.; 50 miles of strand, weighing 60,000 lb.; 1,000,000 lb. of hardware, tools, tape, connectors, etc.; 200,000 insulators. Total weight of all emergency shipments, approximately 8,500 tons.

In the Supreme Court at New York City, March 24, a permanent injunction was granted to W. R. Hearst restraining the New York Central & Hudson River Railroad from using the tracks along Riverside Drive between Seventy-second and Eighty-sixth street, New York, as a switching yard or place for the storage of cars of live stock. The court further ordered that the railroad cease using soft coal along the Drive to operate its locomotives. Mr. Hearst brought his suit following the purchase by him of an apartment house at Eighty-sixth street and Riverside Drive. In his opinion, Justice Philbin said the burning of soft coal and allowing cattle cars to stand on the tracks constituted a nuisance. In his testimony Mr. Hearst said the noise was such between 2 a. m. and 4 a. m. that often it was impossible for him to sleep.

The Oregon-Washington Railroad & Navigation Company is educating employees by means of moving pictures, which are taken from place to place in a special car fitted up for the exhibition. The car is in charge of A. W. Perley, for five years inspector for the state public service commission of Oregon. The pictures shown are interesting and educational. Proper and improper firing of locomotives is illustrated by a double-header, one locomotive throwing out vast volumes of black smoke, showing poor combustion and waste of fuel, the other throwing out clean, white smoke. Proper and improper ways of jacking up cars, of coupling, of handling baggage and baggage trucks and of stepping off and on trains are illustrated. The pictures are full of thrills, involving the crushing to death and injury of several persons—cleverly impersonated by dummies.

The police department of the Cincinnati, Hamilton & Dayton reports that last year 518 persons were arrested for crimes committed against the road and while on the company's property. Of these, there were but four dismissals by the courts. There were 228 cases of petty larceny, 66 for burglary and 170 for riding unlawfully on trains. The total is an increase of 110 arrests as compared with 1912. Chief Special Agent Woodward says that the increase in robberies was caused by the flood in 1912, which threw thousands of men out of work and brought thousands of thugs and thieves into the stricken district under the guise of laborers. These laborers took advantage of every opportunity to steal in the various communities and the railroads were the particular prey of this criminal class. The leniency of the courts also made it difficult to protect the railroad.

A bill proposed in the legislature of New Jersey by the Judiciary Committee of the lower House, provides that if any railroad refuses to carry free every office holder and many minor state employees, it shall be fined $10,000 for each such person ejected from trains after a refusal to pay fare; and this notwithstanding that the Supreme Court has decided upon constitutional grounds that a large proportion of these persons are not entitled to free transportation. If any railroad challenges this law there is a provision to repeal its charter. This bill would make mandatory in New Jersey a practice absolutely forbidden by federal law. Its introduction follows a request made by the railroads that 137 officers and employees of the state, who, under a recent decision of the Supreme Court, were not entitled to ride free, should pay the proper railroad fare. While time of the legislators has been devoted to the introduction of ridiculous measures like this, the railroads have been unable to secure a respectful hearing in the Senate or Assembly for their petition to repeal the extra crew law.

The Morkrum printing telegraph is now in use on the Chicago, Rock Island & Pacific, between Chicago and Des Moines, 358 miles; Chicago and Topeka, 583 miles, and Chicago and El Reno, 896 miles. On these lines the sending of the messages is done by means of perforated tapes. The Morkrum apparatus, with keyboard sending machines, like typewriters, has been in use now on the Lake Shore & Michigan Southern for nearly four years. Its use is being increased by the telegraph companies. On one of the circuits of the Postal Company, 1,200 messages have been transmitted in 9½ hours. With the tape-sending apparatus, messages can be sent at much higher speed; and in case a wire is out of service for a time, tapes can be accumulated, the perforating operators working constantly, and then, when the wire is restored, the messages can be rushed through at high speed. The receiving apparatus is the same as in the system first designed. The perforations are arranged on the tapes in such a way that a message requires only about 1/6 the length used with the Wheatstone apparatus.

A New Information Bureau

The eastern railroads are to establish a bureau of information, with headquarters in New York City. The function of the bureau will be to make permanent the machinery for gathering, classifying and recording information such as was collected by the conference committee in connection with the recent arbitrations on employees' wages. John G. Walber, assistant to the third vice-president of the Baltimore & Ohio, and head of the efficiency, discipline and employment departments of that road, will have charge of the bureau, which will probably be started April 1.

Chicago Terminal Ordinances Passed

Ordinances providing for the erection of the new Union passenger station between Jackson, Adams, Canal and Clinton streets, and the new Pennsylvania Lines freight terminal between Canal street and the Chicago river south of Polk street were passed by the Chicago city council on March 23 by a vote of 63 to 3.

The ordinances are the result of several months of negotiations between the railroads and the council committee on railway terminals, the various stages of which have been reported from time to time in these columns. The detail plans for the passenger terminal, with an architect's drawing, were published in the *Railway Age Gazette* of May 23, 1913, page 1147. Considerable opposition was encountered by the plans proposed by the railways, particularly on account of the proposed new site for the Pennsylvania Lines freight terminals to replace the old terminal on the site of the new passenger terminal. The original site selected for the freight terminals was between Jefferson and Desplaines streets, south of Van Buren street. A report on the entire terminal situation was made for the council committee by John F. Wallace, and another on behalf of a Citizens' Terminal Committee by Bion J. Arnold, and a large number of hearings were held on changes in the railway plans recommended by these experts. In December the railways broke off negotiations but returned in January with an amended plan for the freight terminal. After several hearings on the subject of the compensation to be paid by the roads for streets and alleys vacated, the ordinances were approved by the council committee and by the Chicago Plan Commission and the Citizens' Committee.

The roads agree to pay the city $1,511,000 in cash compensation for the streets and alleys vacated and in addition to construct 12 new viaducts at a cost of $3,050,000, to reconstruct sewers in Canal and connecting streets, at a cost of $3,100,000, to widen viaducts in Fourteenth, Sixteenth and Congress streets at a cost of $2,475,000, and to improve Canal street at a cost of $2,000,000. The Pennsylvania had previously spent about $5,000,000 for the freight terminal site, and the amended plan for the site east of Canal street required an additional expenditure of $12,000,000. It is estimated by the railroads that the total cost of the passenger and freight terminals, with the street and viaduct improvements, and including the cost of the land, will amount to approximately $65,000,000, and that the work will require five years. The passenger terminal will be built by the Union Station Com-

pany, representing the Pennsylvania Lines, the Chicago, Burlington & Quincy and the Chicago, Milwaukee & St. Paul.

The headhouse is to occupy the block between Jackson, Adams, Canal and Clinton streets. To the east of the headhouse, occupying the block east of Canal street to the river, between Jackson boulevard and Adams street, will be the main concourse, which will have on its north and south sides substantially two separate systems of stub-end tracks, 11 tracks for the roads entering the station from the north, and 15 tracks for the roads entering from the south. The designs were made by D. H. Burnham & Co., Chicago.

The Pennsylvania has announced its intention of beginning work on the freight terminal at once, and work on the passenger terminal will begin as soon as this is completed. Some delay may be required for negotiations for the use of property in the terminal site owned by the Chicago & Alton, which now uses the Union Station, but is not represented in the Union Station Company. The plans also include a freight terminal for the Chicago, Burlington & Quincy between Harrison and Taylor streets, near Canal.

Coupled with the terminal ordinances was a resolution providing for the creation of an expert railway terminal commission of seven members to make a study of the entire terminal situation. Four are to be selected by the mayor and three by the Citizens' Terminal committee and the Chicago Plan Commission.

Pennsylvania Signals in the Great Storm

The experiences of the Pennsylvania Railroad in restoring traffic after the snow storm of March 1 are the subject of an article in another column. Concerning the behavior of the block and interlocking signals, not dealt with in that article, we have from an officer of the road the following:

The storm destroyed most of the aerial wire lines between New York and Bristol, Pa., 68 miles; but the signals operated successfully except at a few points where aerial wires were used.

Between Jersey City and Newark, nine miles, and over the line from Manhattan Transfer to the tunnels leading to the Pennsylvania station, Thirty-fourth street, New York, the 2,200 volt aerial signal feeders were broken and crossed in several places. This put all automatic signals and the track circuits and lights at interlockings out of order. The most important signal lights at the interlockings in this territory, were connected to storage batteries and, as the switches and low speed signals were operated from storage batteries, trains were kept moving through the interlockings at reduced speed. The electric trains between Newark and Jersey City (Hudson & Manhattan connection) were kept in operation throughout the blizzard.

West of Newark, eight signals were held at stop near Rahway on account of having the "Bezer foreign current protection system," which requires the use of line wires. At Monmouth Junction eight signals, and at Trenton four signals were at stop on account of having alternating current track circuits, which require the use of line wires. At Morrisville wires which had fallen across the tracks became crossed with high voltage wires in the city, and set fire to a track transformer, burning the relay box at the signal bridge, putting four signals to stop. Vigilance on the part of the repairman, in removing the wires, saved the interlocking station, but not until several instruments in the tower had become so hot that they were smoking.

The three-position signals approaching interlockings gave the caution indication only, as the 90-deg., or clear position, was controlled by line wires.

All other signals operated successfully, being controlled by polarized direct-current or three-position alternating-current track relays.

The alternating current system between Trenton, N. J., and Holmesburg, Pa., a distance of 20 miles, with 3,300 volt signal feeders underground, operated without interruption.

Resolutions, on the Death of George Westinghouse, by the Directors of the Westinghouse Air Brake Company

The board of directors of this company has been called upon to record the death of not a few of its members during the forty-five years of its history. Of the board as originally constituted in 1869, George Westinghouse, the founder of the company and its first and only president, alone survived and retained his active connection with the company until March 12, 1914, when he, too, passed away—his death having taken place at his apartments, Seventy-third street and Central Park West, New York City.

The public press has been filled with generous and well deserved tributes to his character and ability; his achievements as inventor, engineer and manufacturer are a part of the industrial history of his country, and the great loss which his death has inflicted upon the community, the nation and that greater commonwealth—the federation of mankind—will be more clearly recognized and more keenly felt as the present recedes into the past, for, as Emerson has well said, "Genius has no successor."

The natural pride he took in the early and continued success of the Air Brake company—due in large part not only to his inventive ability, but to his wise direction of its commercial and financial affairs—gave it a peculiar place in his regard, and this affection was reciprocated by a personal loyalty on the part of its employees which was most gratifying to him and highly honorable to them. It is a pleasure for this board to testify to the sustained interest he took in every measure that related to the welfare of his co-workers, especially the establishment and later extension of the relief and pension departments. It is likewise a pleasure to record his deep concern in the commercial and industrial progress of the country at large. While he seldom referred to his personal service to the nation, the patriotism which led to the enlistment in the United States army at the early age of seventeen was always in evidence when political matters were discussed by him or in his presence.

The charm of his personality was no less notable than his vigor of mind and strength of purpose. A born leader of men, his forcefulness, generally speaking, was persuasive rather than demonstrative. His high standards of individual purity and business integrity have been and will long be an inspiration to those who were privileged to know him best, and no tribute to his worth that can be expressed in words will serve to indicate the sorrow with which his former associates on this board place on its records the solemn fact that he is no longer with us.

The Westinghouse Memorial Association

This is the name of an organization of the friends of the late George Westinghouse, which was formed at Pittsburgh last week, with the purpose of erecting in that city a memorial of some kind to Mr. Westinghouse. The president of the association is Col. H. G. Prout. It is proposed to open a popular subscription.

Good and Bad Commissions

[From the New York World.]

In seven years the Public Service Commission of the First district, including $2,200,000 asked for this year, has cost New York City nearly $10,000,000. The total expenses of the Interstate Commerce Commission for the past seven years have been approximately $10,255,000.

The jurisdiction of the Public Service Commission of this district is limited to all common carriers operating exclusively within the city, and to the gas and electrical corporations.

By contrast, the Interstate Commerce Commission's powers extend to all interstate traffic by common carriers in the United States, including domestic and import traffic. Last year it disposed of 4,610 applications where unlawful charges had been collected. In addition to investigating and assisting in the prosecution of criminal cases under the Interstate Commerce act, of which seventy-two were concluded last year, the commission carried on the anthracite coal investigation and the investigation into the relation between rail carriers and water lines. It investigated seventy-six train accidents, involving the death of 283 persons and injuries to 1,880 persons. In the course of the year it passed on 3,500 violations of the hours-of-service act by the railroads, and penalties of $133,000 were collected.

It transmitted to United States attorneys for prosecution 191 cases, involving 626 violations of the safety appliance act, and inspected 90,346 locomotive boilers, of which 54,522 were found defective and 4,672 ordered out of service. By direction of Congress it began making a physical valuation of all the railroads of the United States. A series of hearings on eastern railroad rates was merely a part of its routine duties.

Yet with all that it accomplished, during the year ending June 30, 1913, the expenses of the Interstate Commerce Commission were only $1,853,629.03. The Public Service Commission in 1913 cost the city $1,863,161.32—$10,000 *more than the total cost of the Interstate Commerce Commission.*

It is not the fault of the Public Service Act of this state that the city of New York receives so little in return for the huge sums expended by the local commission. It is due entirely to the personnel of the Public Service Commission, which has steadily become more inefficient while its expenses have increased. The Public Service Commissioners draw salaries of $15,000 each. The Interstate Commerce Commissioners draw salaries of only $10,000 each.

Governor Glynn has undertaken to reorganize the up-state Public Service Commission. What does he intend to do about the other commission, which is a burden to New York City and a travesty on government regulation?

New Haven Railroad Club

This is the name of an organization recently started at New Haven, Conn., with the object of promoting railroad knowledge and encouraging social relations and acquaintance among the different departments of the New York, New Haven & Hartford. The first regular meeting, followed by a dinner, was held at the Railroad Young Men's Christian Association in New Haven, March 16. The membership thus far is made up of officers, chief clerks, assistant chief clerks and bureau foremen; but the constitution appears to be rather liberal, not excluding any class. The temporary president is T. M. Prentice. Permanent officers will be elected at a meeting to be held April 21.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 5-8, Hotel Pontchartrain, Detroit, Mich.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Boston, Mass. Convention, May 19, St. Louis.

AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—W. C. Hope, 143 Liberty St., New York.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, East St. Louis, Ill. Next convention, April 21, Houston, Tex.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—E. H. Harman, St. Louis, Mo.; 3d Thursday and Friday in May.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 29 W. 39th St., New York.

AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOC.—H. G. McConnaughy, 165 Broadway, New York. Meetings with Am. Elec. Ry. Assoc.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 20-22, 1914, Los Angeles, Cal.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Karpen Building, Chicago. June 15-17, Atlantic City, N. J.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—A. R. Davis, Central of Georgia, Macon, Ga. Next convention, July 20-22, Hotel Sherman, Chicago.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa. Next annual meeting, June 30 to July 4, Hotel Traymore, Atlantic City, N. J.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Chas. W. Hunt, 220 West 57th St., New York; 1st and 3d Wed., except June, July and August, New York. Annual convention, June 25, Baltimore, Md.

AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wemlinger, 11 Broadway, New York; 2d Thursday of each month, at 2 P. M., 11 Broadway, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. June 16-19, St. Paul-Minneapolis, Minn.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, Highland Park, Ill. Annual meeting, June 24, Minneapolis, Minn.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—C. W. Egan, B. & O., Baltimore, Md. Next convention, May, St. Paul, Minn.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago. Semi-annual meeting, June 12, Hotel Denis, Atlantic City, N. J. Annual convention, October 19-23, Chicago.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 112 West Adams St., Chicago. Next convention, May 19-22, New Orleans, La.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York. Annual meeting, Hotel Chalfont, Atlantic City, N. J., June 18-19.

ASSOCIATION OF WATER LINE ACCOUNTING OFFICERS.—W. R. Evans, Chamber of Commerce, Buffalo, N. Y.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—L. D. Mitchell, Detroit, Graphite Co., Detroit, Mich. Meeting with American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and August, Montreal.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 176 Mansfield St., Montreal, Que.; 1st Thursday, October, November, December, February, March and April, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Fri. in Jan., May, Sept. and Nov. and 2d Thurs. in March, Hotel Statler, Buffalo, N. Y.

CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—L. S. Pomeroy, Old State Capitol building, St. Paul, Minn.; 2d Monday, except June, July, August and September, St. Paul.

ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after second Saturday, Harrisburg, Pa.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. H. Hiles, Oliver building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Richmond, Va. Next convention, May 13, Hotel Galvez, Galveston, Tex.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—E. S. Koller, 226 W. Adams St., Chicago; Wed. preceding 3d Thurs., Chicago.

INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, 11, rue de Louvain, Brussels, Belgium. Convention, 1915, Berlin.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. G. Hall, 922 McCormick building, Chicago. Annual convention, May 18-21, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 829 West Broadway, Winona, Minn. Next convention, July 14-17, Hotel Sherman, Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio. Next convention, third Tuesday in August.

MAINTENANCE OF WAY MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next convention, November 17-19, 1914, Detroit, Mich.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York. Next annual meeting, May 25-28, Hotel Walton, Philadelphia.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Karpen building, Chicago. June 10-12, Atlantic City, N. J.

MASTER CAR & LOCOMOTIVE PAINTERS' ASSOC. OF U. S. AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Next convention, September 8-11, Nashville, Tenn.

NATIONAL RAILWAY APPLIANCE ASSOC.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Meetings with Am. Ry. Eng. Assoc.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.

NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3rd Friday in month, except June, July and August, New York.

NORTHERN RAILROAD CLUB.—C. L. Kennedy, C. M. & St. P., Duluth, Minn.; 4th Saturday, Duluth.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, Union Station, Peoria; 2d Thursday.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 30 Church St., New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOC.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Assoc. Ry. Elec. Engrs.

RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, Mobile & Ohio, Mobile, Ala. Annual meeting, 1st Tuesday in October.

RAILWAY GARDENING ASSOCIATION.—J. S. Butterfield, Lee's Summit, Mo.

RAILWAY DEVELOPMENT ASSOCIATION.—W. Nicholson, Kansas City Southern, Kansas City, Mo.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa. New York, June 9. Annual meeting, Bluff Point, N. Y., September 22.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio. Next convention, May 18-20, Hotel Raleigh, Washington, D. C.

RAILWAY SUPPLY MANUFACTURERS' ASSOC.—J. D. Conway, 2135 Oliver bldg., Pittsburgh, Pa. Meetings with M. M. and M. C. B. Assocs.

RAILWAY TELEGRAPH & TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 50 Church St., New York. Meetings with Assoc. of Ry. Teleg. Supts.

RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill. Next convention, September 8-10, 1914, Chicago.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.

SALT LAKE TRANSPORTATION CLUB.—R. E. Rowland, 519 Boston building, Salt Lake City, Utah; 1st Saturday of each month, Salt Lake City.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmonds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—Carl Nyquist, La Salle St. Station, Chicago.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., Atlanta.

TOLEDO TRANSPORTATION CLUB.—J. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillsburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 291 Broadway, New York; last Tuesday in month, except June, July and August, Waldorf-Astoria, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie, Pittsburgh, Pa.; meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library building, St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7122 Stewart Ave., Chicago. Next convention, June 16, Jacksonville, Fla.

TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, L. S. & M. S., Detroit, Mich.; meetings monthly.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Next meeting, August, Chicago.

UTAH SOCIETY OF ENGINEERS.—Fred D. Ulmer, Oregon Short Line, Salt Lake City, Utah; 3d Friday of each month, except July and August.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen building, Chicago; 3d Tuesday of each month, except June, July and August, Karpen building, Chicago.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago; regular meeting 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

Traffic News

Tennessee newspapers report that commercial interests in that state are agitating for a reform which shall prohibit the granting of free passes on railroads to officers of the state.

The Central of New Jersey and the Ann Arbor have applied to the Interstate Commerce Commission for authority to continue the ownership and operation of steamboat lines.

In the Federal Court at Birmingham, Ala., the grand jury has returned an indictment against the Alabama Great Southern for violation of law in carrying cotton from Boaz, Ala., to New Orleans at 42.8 cents per 100 lb., when the tariff was 54 cents.

Officers of the Boston & Maine have given notice in Massachusetts, New Hampshire and Maine that the company contemplates advancing passenger fares throughout its lines to the uniform basis of 2¼ cents a mile. It is said that probably the state commissions of the different states will meet in conference before approving so sweeping a change.

A press despatch from Seattle March 21 says that the passage of a law for the construction of railroads by the government in Alaska has been followed by a great increase in the movement of passengers to Alaska. Steamships are unable to take all of the people who apply for passage. Two thousand men have gone north from Seattle since the railroad bill was passed.

Agents of the Southern Railway are giving illustrated lectures on the southeast as the ideal place for the homeseeker, traveling, for this purpose, throughout the north. The lectures have been conducted in counties and vicinities in which the Southern Railway System made exhibits at county fairs in 1913. They have been very popular and at almost every place the crowds have filled the halls. In many places in New York and Pennsylvania every seat was taken and standing room was filled. The views shown are largely agricultural and horticultural, but include scenic, industrial and city subjects. Arrangements have just been completed for a series of lectures in Indiana and Ohio.

The New York State Public Service Commission, Second district, announces that under permission from the commission the American Express Company and other express companies have filed tariffs establishing, on less than statutory notice and as effective March 20, new rates applying to express traffic for transportation between points short distances apart. The new rates effect hundreds of reductions from those which have been in effect since February 1. The reduction in first-class rate from 60 cents to 50 cents or 55 cents per 100 lb. between points nearby to each other is general throughout the state. In many other instances rates are reduced from 75 cents to 60 cents; 90 cents to 75 cents; and from $1 or $1.15 to 90 cents per 100 lb.; with corresponding reductions on articles of food and drink and other articles rated second class.

The nominating committee of the Traffic Club of Chicago has nominated the following as the regular ticket of officers for the ensuing year, to be elected on March 31: For president, J. Chas. Maddison, traffic manager, Montgomery Ward & Co.; first vice-president, C. A. Cairns, general passenger and ticket agent, Chicago & North Western; second vice-president, H. F. Prince, traffic manager, American Steel Foundries; third vice-president, Chas. H. Stevens, general agent, Chicago, Peoria & St. Louis; secretary, W. H. Wharton, commercial agent, Nashville, Chattanooga & St. Louis; treasurer, Charles B. Hopper, general freight agent, Goodrich Transit Company; directors for two years, F. W. Smith, member, Uniform Classification Committee; Carl Howe, manager, New York Central Fast Freight Lines; A. G. Francis, railroad agent, Chicago Telephone Company; A. B. Schmidt, traffic manager, Sears, Roebuck & Company.

That petitions having a multitude of backers do not always possess the full importance with which they are credited, is illustrated in a recent letter sent to the Interstate Commerce Commission by the Prest-o-lite Company of Indianapolis. The Indianapolis Chamber of Commerce had sent to the commission a resolution unfavorable to the application of the eastern railroads for authority to make an increase of 5 per cent. in freight rates; but the Prest-o-lite Company, declaring that it is one of the largest shippers in Indianapolis, and perhaps the very largest, says that it is in favor of the railroad petition, believing that there should be a concerted effort on the part of manufacturers and shippers to show their willingness to share a very small part of their own prosperity with the railroads. The Prest-o-lite Company has 52 branch stores and plants in the United States and furnishes yearly an amount of freight traffic on which the transportation bills amount to over $250,000.

The Interstate Commerce Commission announces that the railroads will be heard further on the question of the proposed 5 per cent. increase in freight rates. The carriers expressed their desire to present additional testimony touching their financial requirements and also to offer evidence in rebuttal of the testimony recently introduced in opposition to the proposed increase. Having no other dates available the commission has postponed the argument on the spotting question now assigned for March 30 and 31, and will devote those dates to the hearing of the railroads' further evidence. If they are not able to complete this additional testimony at the close of March 31, the hearing will be continued on April 20, 21 and 22, those being the earliest available additional dates. As none of the commissioners was able to be present when the testimony was given on this subject by the representative of the railroad commissions of the states of Iowa, Kansas, Nebraska, North Dakota, South Dakota, Arkansas, Oklahoma and Missouri, he has been requested to appear again on Monday, March 30, to restate in substance the testimony already given by him.

Car Surpluses and Shortages

Arthur Hale, chairman of the committee on relations between railroads of the American Railway Association, in presenting statistical bulletin No. 163-A, giving a summary of car surpluses and shortages by groups from November 21, 1912, to March 15, 1914, says: The total surplus on March 15, 1914, was 132,010 cars; on March 1, 1914, 159,480 cars, and on March 15, 1913, 57,998 cars.

Compared with the preceding period; there is a decrease of

CAR SURPLUSES AND SHORTAGES

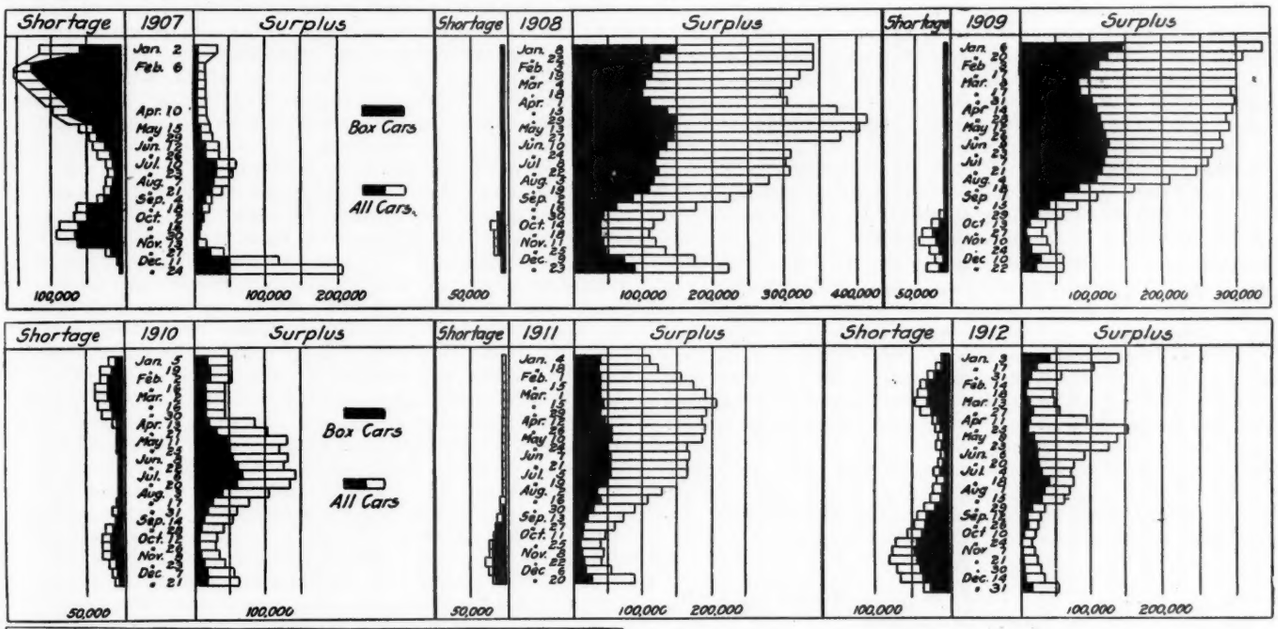
Date	No. of roads.	Surpluses: Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.	Shortages: Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.
Group *1.—March 15, 1914	7	0	480	892	28	1,400	452	54	0	677	1,183
" 2.— " 15, 1914	31	788	388	1,109	643	2,928	295	0	1,865	0	2,160
" 3.— " 15, 1914	28	2,886	1,906	15,087	2,174	22,053	584	100	440	262	1,386
" 4.— " 15, 1914	11	7,607	1,364	4,029	1,200	14,200	0	50	900	30	980
" 5.— " 15, 1914	23	2,189	681	5,837	1,128	9,835	415	50	0	0	465
" 6.— " 15, 1914	29	9,045	921	3,021	6,043	19,030	70	201	77	6	354
" 7.— " 15, 1914	4	203	76	1,527	1,386	3,192	0	0	0	0	0
" 8.— " 15, 1914	17	4,959	165	3,099	3,331	11,554	0	125	0	0	125
" 9.— " 15, 1914	11	2,517	451	425	1,721	5,114	0	0	0	0	0
" 10.— " 15, 1914	21	8,109	2,454	4,107	9,976	24,646	7	0	0	0	7
" 11.— " 15, 1914	6	13,358	2,040	0	2,660	18,058	480	0	0	5	485
Total	188	51,661	10,926	39,133	30,290	132,010	2,303	580	3,282	980	7,145

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin and Minnesota lines; Group 7—Montana, Wyoming, Nebraska, North Dakota and South Dakota lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Washington, Oregon, Idaho, California, Nevada and Arizona lines; Group 11—Canadian lines.

27,470 cars, of which 1,030 is in box, 25,689 in coal and gondola, 785 in miscellaneous, and an increase of 34 in flat car surplus. The decrease in box car surplus is in groups 2 (New York, New Jersey, Delaware, Maryland and eastern Pennsylvania); 3 (Ohio, Indiana, Michigan and western Pennsylvania); 8 (Kansas, Colorado, Oklahoma, Missouri and Arkansas); 9 (Texas, Louisiana and Mexico), and 10 (Washington, Oregon, Idaho, California, Nevada and Arizona). The decrease in coal and gondola car surplus is in groups 2, 3, 8, 9 and 10 (as above), 4 (the Carolinas and Virginias), and 6 (Iowa, Illinois, Wisconsin and Minnesota). The decrease in miscellaneous car surplus is in groups 2, 4 and 10 (as above); 1 (New England Lines), and 5 (Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida). The increase in flat car surplus is in groups 6 and 9 (as above) and 11 (Canadian Lines).

The total shortage on March 15, 1914, was 7,145 cars; on March 1, 1914, 5,573 cars, and on March 15, 1913, 20,223 cars.

Compared with the preceding period; there is an increase of 1,572 cars, of which 411 is in flat, 1,888 in coal and gondola, and a decrease of 680 in box and 47 in miscellaneous car shortage.



Car Surpluses and Shortages, 1907 to 1914

The increase in flat car shortage is in groups 1, 3, 5, 6 and 8 (as above). The increase in coal and gondola car shortage is in groups 2, 3 and 6 (as above). The decrease in box car shortage is in groups 1, 3 and 6 (as above). The decrease in miscellaneous car shortage is in groups 6 and 10 (as above).

Compared with the corresponding period of last year; there is an increase in the total car surplus of 74,012 cars, of which 34,029 is in box, 8,011 in flat, 21,266 in coal and gondola, and 10,706 in miscellaneous car surplus. There is a decrease in the total car shortage of 13,078 cars, of which 10,348 is in box, 1,276 in flat, 494 in coal and gondola, and 960 in miscellaneous car shortage.

The accompanying table gives car surplus and shortage figures by groups for the last period covered in the report and the diagram shows total bi-weekly surpluses and shortages from 1907 to 1914:

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The commission has suspended from March 20 to July 8 a tariff of C. J. Pierce, agent, increasing class rates from stations on the Maine Central on traffic destined to points beyond the Niagara frontier.

The commission has suspended from March 25 to July 23 a provision in a Minneapolis, St. Paul & Sault Ste. Marie tariff canceling the milling in transit and rehandling privileges on grain and grain products at St. Croix Falls, Wis.

The commission has suspended from March 20 to July 18 a provision in a Mutual Transit Company tariff canceling the commodity rates on salt from Marine City and other points in Michigan to Lake Superior ports and discontinuing the service on which they apply.

The commission has suspended from April 1 to July 30 certain schedules in tariffs of R. H. Countiss, C. C. McCain and Eugene Morris, agents, increasing the transcontinental class and commodity rates both east and westbound, on traffic to and from San Jose, Santa Clara and Marysville, Cal.

The commission has suspended from March 20 to July 18 certain schedules in tariffs of R. H. Countiss, C. C. McCain and Eugene Morris, agents, increasing rates on corn flour and buckwheat flour in carloads from St. Joseph, Mo., and various other points to San Francisco and other California terminals.

Special Examiner Watkins, of the Interstate Commerce Commission has been holding hearings in Oklahoma on a complaint filed by the Oklahoma Railroad Commission, asking that the railways be compelled to establish an interstate rate of two cents per mile between Missouri, Arkansas and Oklahoma. A large amount of statistical evidence was introduced by the railroads to show that the reduction of fares would be unreasonable.

The commission has suspended from March 25 to July 23 tariffs of the Chicago, St. Paul, Minneapolis & Omaha, the Great Northern, the Minneapolis, St. Paul & Sault Ste. Marie and the Northern Pacific increasing rates to points in Minnesota on traffic moving via interstate routes and between points in Minnesota and other states. The carriers claim that the canceled rates were published in order to line up the interstate rates with freight rates established by the Minnesota commission as a result of the Cashman Act passed by the legislature of that state.

Chicago & North Western Reconsignment Rules

Opinion by Commissioner Clark:

The commission finds reasonable a rule of the Chicago & North Western reading: "Reconsigning orders for points beyond the rails of the C. & N. W. Railway or the C. St. P. M. & O. Railway will not be accepted on perishable or other freight when loaded in C. & N. W. Ry. or C. St. P. M. & O. Ry. refrigerator cars." This rule will apply mainly to shipments of potatoes. It is not meant to restrict reconsigning of shipments at Chicago; but is designed to preserve an adequate supply of these system cars of a special type for the general movement of the business of the system and to insure notice at the time cars are ordered for direct through shipments that they are desired for off-the-line points so that private or foreign cars may be supplied. The words "originating at points on the lines of said carriers" should be added, however, so as to exclude shipments originating beyond the North Western's rails. (29, I. C. C., 620.)

Lumber Rates from Oregon and Washington to Eastern Points

Opinion by Commissioner Harlan:

The Union Pacific and certain other carriers serving the northwest have proposed to close established routes for certain traffic to eastern points. The changes fall into four groups. 1. The commission finds that the proposed closing of the Wallula gateway to shipments of wool from local points on the lines of the Oregon-Washington Railroad & Navigation Company to the east over the Northern Pacific will not involve unreasonable consequences. 2. It finds unreasonable the proposed closing of the Spokane, Silver Bow and Butte gateways to shipments of lumber originating on other lines and destined to points of consumption on the lines of the Union Pacific system. 3. It likewise finds unreasonable a proposed cancellation of through routes and joint rates by way of the Colorado gateways upon general traffic between points on the lines of the Oregon-Washington and the Missouri river and points east. The Union Pacific, even though it may have the shortest and most efficient line between its western divisions and the Missouri river, cannot thus attempt to put aside the competition of the prairie lines to Denver or disregard the interests of shippers who may wish to ship via Denver for other special reasons. 4. Certain traffic and tariff arrangements of the Chicago, Milwaukee & St. Paul and the Great Northern with various Puget Sound lines serving particular mills are condemned.

Rates on Green Fruit from Points in Idaho, Oregon and Utah to Eastern Destinations

Opinion by Commissioner Meyer:

The commission decides along the lines laid down in *Lumber Rates from Oregon and Washington to Eastern Points* that a proposed cancellation of through routes and joint rates on green fruit from points on the Oregon Short Line to destinations on and east of the Missouri river and to a few points west of the river whereby shippers will be obliged to ship over the lines of the Union Pacific alone is not justified. (29, I. C. C., 650.)

Paducah, Ky., Discriminated Against

Paducah Board of Trade v. Illinois Central et al. Opinion by Commissioner Meyer:

The commission finds that there is an undue discrimination against Paducah in favor of Cairo, Ill., in the present rates on lumber from Mississippi, Louisiana and that part of Arkansas south of the line of the Chicago, Rock Island & Pacific from Memphis, to Little Rock. The commission holds, therefore, that the defendants who operate east of the Mississippi river should maintain rates to Paducah from substantially equidistant points or groups in Mississippi and Louisiana east of the river no higher than one cent below those contemporaneously maintained from the same points to Cairo. The defendants who operate west of the Mississippi river will be required to maintain rates to Paducah from substantially equidistant points in both Arkansas and Louisiana west of the river, on and south of the line of the Chicago, Rock Island & Pacific from Memphis to Little Rock no higher than those contemporaneously maintained from the same points to Cairo. (29, I. C. C., 583.)

Paducah Board of Trade v. Illinois Central et al. Opinion by Commissioner Meyer:

The commission finds that the rates on potatoes, cabbages, onions, beans and canned goods from points in central freight association and western trunk line territories to Paducah and the rates on lumber from Paducah to points in central freight association, trunk line and western trunk line territories are unreasonable and discriminatory as compared with the rates to and from Cairo. It is, therefore, held that the rates on the former commodities from central freight association and trunk line territories to Paducah should not exceed those to Cairo by more than one cent per 100 lb., and that the rates on lumber from Paducah to central freight association, trunk line and western trunk line territories should not exceed those from Cairo by more than one cent per 100 lb. (29, I. C. C., 593.)

Louisville as a Lumber Re-handling Point Discriminated Against

Norman Lumber Company et al v. Louisville & Nashville et al. Opinion by Commissioner Meyer:

The commission finds that defendants unduly discriminate against Louisville to the undue preference of other Ohio river crossings in the adjustment of inbound and outbound rates on lumber rehandled at those points on its way from equidistant points in southeastern territory to equidistant points in central freight association territory and from Mississippi valley territory to western termini and trunk line territory. It holds, therefor, that the carriers which serve Louisville to the north should either discontinue the absorption of the switching charges on lumber from Covington and Newport to Cincinnati or eliminate the bridge toll from the rates from Louisville by applying the same rates from that point to central freight association territory, as from New Albany, Ind., and these should in no instance be greater to equidistant points than those from Cincinnati, Ohio. The lines north of the river should maintain from Louisville to western termini and trunk line points over 500 miles from Cincinnati rates on lumber which do not exceed those from Cincinnati by more than 2½ cents per 100 lb. The carriers serving Louisville from the south will be required to maintain from southeastern points to Louisville rates on lumber which are 1 cent less than those contemporaneously maintained to Cincinnati, New Albany, or other equidistant north-bank crossings. However, should the lines north of the river elect to remove the discrimination in favor of Covington and Newport by eliminating the bridge toll in the rate from Louisville, no change will be required in the rates to Louisville from equidistant southeastern points. The lines south of the river will also be required to maintain to Louisville rates 3½ cents less than those contemporaneously maintained to Cincinnati from points in Mississippi valley territory south of the Ohio, east of the Mississippi, and west of the line of the Mobile & Ohio within 500 miles of Louisville, and 2½ cents less from points over 500 miles from Louisville. (29 I. C. C., 565.)

Interior Iowa Cities Case

The State of Iowa et al. v. Chicago, St. Paul, Minneapolis & Omaha et al. Opinion by Commissioner Harlan:

In a former report in this case the rate adjustments on class traffic between points in the interior of Iowa and points east of the Indiana-Illinois state line were condemned as being unreasonable because of the excessive proportional rates applied between the Mississippi river and the interior Iowa points. It was ordered that the defendant submit a schedule of proportional class rates graded back across the state on the basis of the proportional scale of 55 cents between the rivers fixed in the Warnock case. This schedule has now been filed and is approved by the commission. It is made up by applying the Iowa distance scale from the nearest river crossing and adding thereto 2 cents on the first and second classes, and 1 cent on the remaining classes. The fourth section application is also allowed whereby carriers may continue to meet the rates over the direct route to the nearest gateway to points in Iowa, such as Des Moines, and to maintain higher rates to intermediate points. (29 I. C. C., 536.)

Rates from Chicago to Points in Iowa

Cedar Rapids Commercial Club v. Chicago, Rock Island & Pacific. Opinion by Commissioner Harlan:

The commission in a previous report in this case ruled that the rates from Chicago to the Missouri river made on an 80 cent scale should be graded back across the state of Iowa down to the 37½ cent rate at the Mississippi river. The carriers have graded the 80 cent first class rate at the Missouri river down to the 37½ cent rate at the Mississippi river as directed, but

they have applied rates on the lower classes with relationship to first class rates on a scale of percentages applied in Minnesota by the railroad and warehouse commission. This results in many of the class rates being considerably above those now in existence, this being especially the case in the third and fourth and class A rates under which a very large proportion of the traffic moves. The commission believes that the present Missouri river scale of percentages will be too low, and therefore establishes a new scale of percentages for the future. (29, I. C. C., 539.)

The Mississippi River Case

The State of Iowa et al. v. Atchison, Topeka & Santa Fe et al. Opinion by Commissioner Harlan:

In a previous report in this case it was found that rates between the upper Mississippi river crossings in the state of Iowa and points east of the Indiana and Illinois state line, were unreasonable and it was ordered that the first class rate between New York and the upper Mississippi river crossings be reduced from 97 cents to 90 cents per 100 lb. It is now held, in addition, that from and to Buffalo and Pittsburgh and points taking the same rates, the rate should be 66 per cent. of the New York rate to the upper crossings. The commission also finds that the rates between points west of Buffalo and Pittsburgh and the upper crossings for distances of more than 500 miles should be on the same scale of arbitraries over the rate to and from St. Louis as applies from Buffalo and Pittsburgh; for distances of 500 miles and under, where the average distances between the central freight association points and Keokuk, Burlington, Clinton and Dubuque are the same or less than the distances to St. Louis, the same scale of differentials over the St. Louis rates should apply. But where the average distance to the upper crossings exceeds the distance to St. Louis the scale of differentials mentioned will be exceeded by one cent on the first two classes and by one-half cent on the remaining four classes for each 25 miles or fraction thereof that the distance to the upper crossings exceeds the distance to St. Louis. Certain exceptions to this rule are found proper in order to preserve relationships which have hitherto existed. The commission does not find it necessary to demand that eastbound and westbound rates be on a parity. It is held for the present that eastbound rates to central freight association points from the upper crossings should not exceed the eastbound rates from St. Louis by an amount greater than the westbound rates from the same point to the upper crossings exceed those to St. Louis. Commodity rates in general are to remain unchanged, except where the application of a class rate will make a lower charge. It is held, however, that the commodity rates between central freight association points and the upper crossings should not exceed the rates between the same points and St. Louis by more than the differential applied between the same points on the class in which the commodity would fall under the official classification. (29, I. C. C., 530.)

STATE COMMISSIONS

The Canadian Railway Commission has suspended the tariffs filed recently by the railroads naming increased fares to be charged passengers who occupy compartments and drawing rooms in sleeping cars.

The Illinois Public Utilities Commission held a hearing at Chicago on March 23, on the complaint of industrial roads in the Chicago district, asking the suspension of a tariff filed by the trunk line railways effective April 1, canceling the allowances heretofore paid to industrial roads. The commission reserved its decision until after another hearing.

The railroad commission of Louisiana, after a hearing on March 10 and 11, at which a number of shippers protested against certain features of the Interstate Commerce Commission's tariff of express rates, which had been adopted by the carriers in Louisiana for intrastate traffic and which resulted in advances over the rates previously in effect in the state, has issued an order disapproving advances made on certain commodities listed in the official express classification No. 21, which the commission considers are properly moving under the classification of general specials and which were not intended or warranted under the commission's previous order. This provided that existing commodity rates approved or established by the commission applicable to Louisiana intrastate business should be continued in full force and effect. The commission orders therefore that in all cases where higher rates than those in effect prior to February 1, 1914, have been charged and collected on shipments listed in the classification refunds shall be made to shippers.

The Pennsylvania Public Service Commission has served notice on all common carriers that no change shall be made in any tariff except on 30 days' notice to the commission. This declaration was occasioned by the fact that the Monongahela Connecting Railway, and a large number of shippers on the lines of other short line railroads in the vicinity of Pittsburgh, have informed the commission that some of the [larger] railroad companies intend to make a change in their intrastate rates, to take effect April 1. The complainants allege that these contemplated changes are unreasonable and preferential. The carriers are requested to advise at once as to whether they will postpone the effective date on the proposed rates until the thirty days' notice shall have been given to the commission. The rates which the carriers propose to withdraw are the joint rates applying shipments to and from industries situated on industrial roads, and the effect will be the application of rates only to and from the junction point. In other words, the railroads are following the rule laid down by the Interstate Commerce Commission for interstate traffic.

PERSONNEL OF COMMISSIONS

Warrick R. Edwards, M. Am. Soc. C. E., assistant engineer of bridges of the Baltimore & Ohio, has been appointed senior structural engineer of the eastern district, division of valuation, of the Interstate Commerce Commission, with office at Washington. Mr. Edwards was born at Kirkwood, Mo., February 8, 1869. He graduated from Washington University, St. Louis, with the degree of Bachelor of Engineering in 1888, and entered the service of the bridge department of the city of St. Louis, where he remained until June, 1889. He then entered the service of George S. Morison as rodman on the construction of the Mississippi River bridge at Memphis, afterward serving as shop inspector on superstructure of this bridge. In 1892 he was employed as draftsman in the bridge and construction department of the Pencoyd Iron Works. He again entered railway service in June, 1894, with the bridge department of the Baltimore & Ohio, where he has remained continuously, holding the positions of inspector, assistant to the engineer of bridges and buildings, assistant engineer in chief, bridge draftsman and assistant engineer of bridges.

Thomas B. Purves, who has been appointed senior mechanical engineer for the eastern district, division of valuation, of the Intertsate Commerce Commission, with office in Washington, was born January 4, 1858, at East Albany, N. Y. After receiving an academic education, Mr. Purves entered the service of the Boston & Albany as a machinist's apprentice, and during his years of apprenticeship studied mechanical engineering under the direction of his father, who was master mechanic of the Boston & Albany at Albany. Afterwards he served as locomotive fireman, engine house foreman, general foreman and master mechanic; and finally was promoted to the position of superintendent of motive power and machinery, which position he resigned in 1904. In 1906 he went to the Denver & Rio Grande as superintendent of motive power and machinery, which position he occupied until 1909, since which time he has been engaged with the railroad commissioners of Massachusetts on the appraisal of the motive power and equipment of the New York, New Haven & Hartford, the Eastman Heater Car Company and the Boston, Revere Beach & Lynn Railroad.

B. T. Elmore, recently appointed engineer of roadway and track for the eastern district, division of valuation of the Interstate Commerce Commission, with office in Washington, D. C., was born December 14, 1866, near Mobile, Ala. He graduated as a civil engineer from the University of the South, at Sewanee. He began railroad work in January, 1886, and from that time until March, 1899, was employed as rodman, transitman, draftsman, masonry and tunnel inspector, assistant engineer and resident engineer on preliminary and location surveys, and as resident engineer on new construction and revision of grades on various railroads in Alabama, Georgia, Tennessee, South Carolina, Virginia, West Virginia and New York. From 1899 to 1901 he was resident engineer on surveys and construction on the Baltimore & Ohio South Western in Indiana; then for two years as assistant engineer on grade revision of the St. Louis-

Louisville Lines of the Southern Railway in Indiana and Illinois. From 1902 to 1914 he was locating engineer, engineer of surveys, assistant chief engineer and division engineer for the Virginian Railway, having charge of surveys and construction of the greater part of the Virginian Railway and branches.

Morris A. Zook, M. Am. Soc. C. E., who was recently appointed resident engineer, division of valuation, Interstate Commerce Commission, with office at Washington, D. C., was born March 2, 1859, at Philadelphia, Pa. He graduated as civil engineer from the Pennsylvania Polytechnic College in 1879, after which he entered the service of the Philadelphia, Wilmington & Baltimore (Pennsylvania System) as draftsman in the car shop at Wilmington, Del. After a few months of this service he became, successively, assistant engineer, resident engineer, chief of location on the Shenandoah Valley and the Norfolk & Western. In 1883 he entered the service of the Pennsylvania Lines West, being successively assistant construction engineer, chief engineer of the Indianapolis Union Railway, engineer of maintenance of way of the Indianapolis & Vincennes, and then in the same position on the Chicago Division of the Chicago, St. Louis & Pittsburgh. In 1890 he entered the service of the Louisville, New Albany & Chicago as engineer of maintenance of way and later was made superintendent of the same line.

M. A. Zook

In 1892 he went to the Queen & Crescent as engineer of maintenance of way, in which position he continued until 1898, when he took a similar position on the Louisville, Evansville & St. Louis Consolidated. In 1902 he was engineer in charge of reconstruction of the Lehigh & Susquehanna division of the Central of New Jersey.

In 1904, after twenty-five years of continuous railroad service he retired to take up independent work as a consulting engineer. In this capacity he served the Peabody Coal Company, the New York, New Haven & Hartford (on valuation) the Havana Central, the Chicago Great Western and the Canadian Pacific (valuation), and on the valuation of railroad lines in Missouri and in Canada.

COURT NEWS

In the United States District Court at Detroit, Mich., March 21, the petition of the Pere Marquette Railroad, in the matter of mail pay was dismissed. The receivers asked the court, as the guardian of the road, to determine whether or not the road should continue to carry United States mail under its present contract. Judge Tuttle held that the court had no right to issue an opinion on a question under investigation by Congress. The receivers alleged that, although the government has increased the weight limit of parcel post packages, it failed to increase the compensation to be allowed to the Pere Marquette, and that its act made the contract void.

In the federal court at St. Louis on Monday last Judge Adams dissolved a temporary injunction restraining the Wabash Railroad from filing new rates for freight from the Illinois Glass Works, at Alton, Ill., holding, in substance, that it was for the Interstate Commerce Commission to decide whether a railroad was an industrial line or a common carrier and whether a railroad could change tariffs. The new tariff cancels the present division of through rates with the Illinois Terminal Railroad, a line subsidiary to the Illinois Glass Company. The Wabash filed the new rates soon after the Interstate Commerce Commission decided that certain concessions to industrial lines were in reality rebates and therefore improper.

Railway Officers

Executive, Financial, Legal and Accounting

Joseph F. Gould has been appointed general counsel of the Bangor & Aroostook, with office at Bangor, Me.

Maury Middleton has been appointed assistant treasurer and assistant cashier of the Southern Railway, with office at Washington, D. C.

James Russell, general superintendent of the Western district of the Great Northern at Seattle, Wash., has been appointed assistant to the vice-president of the Denver & Rio Grande, with headquarters at Denver, Col.

W. H. Beardsley, vice-president of the Florida East Coast at New York, has been elected president. William R. Kenan, Jr., a director, has been elected vice-president, and L. C. Haines, purchasing agent, at New York, has been appointed treasurer, all with headquarters at New York.

Operating

J. J. Murphy, trainmaster of the Chicago, Milwaukee & St. Paul, at Malden, Wash., has been appointed superintendent of the Rocky Mountain division, with office at Three Forks, Mont.

William D. Mason, whose appointment as superintendent of the Sioux City division of the Great Northern, with headquarters at Sioux City, Ia., has already been announced in these columns, was born at Montreal, Que. He began railway work in 1884 with the Grand Trunk, and in 1899 entered the service of the Great Northern in a clerical capacity. He was promoted to assistant superintendent in 1906, and was then successively chief clerk to the assistant general manager and trainmaster at Sioux City, until 1912, since which time he has been consecutively trainmaster and acting superintendent of the Fergus Falls division until March 10, when he was made superintendent of the Sioux city division, as above noted.

D. B. Carson, assistant general manager of the Nashville, Chattanooga & St. Louis at Nashville, Tenn., has been appointed acting general manager. E. M. Wrenne, assistant superintendent at Nashville has been appointed assistant superintendent of transportation; G. D. Hicks, superintendent of the Huntsville division, has been appointed assistant superintendent of the Nashville division; Theo. Speiden, roadmaster of the Louisville & Nashville at Nashville, has been appointed assistant superintendent of the Chattanooga division of the Nashville, Chattanooga & St. Louis, all with headquarters at Nashville; W. G. Templeton, trainmaster at Nashville, has been appointed acting superintendent of the Huntsville division, with office at Tullahoma, effective April 1.

Louis H. Phetteplace, whose appointment as general manager of the Carolina, Clinchfield & Ohio, with headquarters at Erwin, Tenn., has been announced in these columns, was born on April 30, 1871, at Smithsburg, Md., and was educated in the public schools. He began railway work as an operator on the Western Maryland in 1890, and from June of that year until November, 1893, was operator on the Norfolk & Western. He was subsequently despatcher until July, 1901, and then became chief despatcher of the same road. In June, 1904, he was appointed assistant trainmaster, and in October of the following year was promoted to trainmaster of the same road. He went to the Carolina, Clinchfield & Ohio in November, 1908, as superintendent at Erwin, Tenn., and three years later was promoted to general superintendent, which position he held at the time of his recent appointment as general manager of the same road, as above noted.

Traffic

Morris Vinson has been appointed traveling passenger agent of the Erie, with office at San Francisco, Cal., succeeding R. T. Hughes, resigned.

J. W. White has been appointed commercial agent of the Missouri, Kansas & Texas, with office at Chicago, succeeding John J. Rogers, deceased.

Elbert Blair, general freight and passenger agent of the Texas

Central at Waco, Tex., has been appointed commercial agent of the Missouri, Kansas & Texas at Dallas, Tex.

F. W. Kirtland, general freight agent of the Florida East Coast at St. Augustine, Fla., has been appointed to the new position of freight traffic manager, and W. P. Boger, chief clerk of the freight department at St. Augustine, succeeds Mr. Kirtland, both with headquarters at St. Augustine.

C. E. Jenney, city passenger and ticket agent of the Grand Trunk at Toronto, Ont., has been appointed general agent, passenger department, of the Grand Trunk, the Grand Trunk Pacific and the Grand Trunk Pacific Coast Steamship Company, Limited, in charge of territory in British Columbia, Rivers Inlet and south, with office at Vancouver, B. C.

W. I. Jones having been transferred, the office of assistant to general traffic manager of the Missouri Pacific and the St. Louis, Iron Mountain & Southern is abolished, effective March 15. Effective April 1, H. M. Adams is appointed general traffic manager of these roads, with office at St. Louis, vice J. T. Hendricks, resigned to enter the service of another company.

W. S. Yeatts, Canadian freight agent of the Pennsylvania Railroad at Toronto, Ont., has been appointed special agent in the general freight agent's office at Philadelphia, Pa., and S. T. Stackpole, freight solicitor, succeeds Mr. Yeatts. R. K. Neilson, chief clerk to the New England freight agent at Boston, Mass., has been promoted to freight solicitor, with office at Uniontown, Pa.

J. J. McTague, traveling freight agent of the Chicago, Milwaukee & St. Paul, with headquarters at New York, has been appointed commercial agent at Buffalo, N. Y., in place of C. H. Mitchell, who has been transferred to Duluth, Minn., in a similar capacity, succeeding C. L. Kennedy, promoted. A. W. Jones is appointed commercial agent at Winnipeg, Man., vice Thomas Donald, assigned to other duties.

Engineering and Rolling Stock

D. R. Morris, signal engineer of the El Paso & Southwestern, has resigned to go with the Federal Signal Company.

T. H. Nichols, assistant roadmaster of the Great Northern at Spokane, Wash., has been appointed roadmaster at Marcus, Wash.

Charles G. Delo, whose appointment as chief engineer of the Chicago Great Western, with headquarters at Chicago, has already been announced in these columns, was born December 5, 1866. He was educated at Kansas State University and Cornell College, and began railway service in 1887 with the Atchison, Topeka & Santa Fe as rodman with a bridge corps. Subsequently for one year he was draftsman in an architectural office, and from 1890 to July, 1902, was with the Burlington, Cedar Rapids & Northern consecutively as assistant engineer, draftsman and division engineer at Cedar Rapids, Iowa. He then went to the Chicago, Rock Island & Pacific as principal assistant engineer at Chicago, resigning in November, 1903, to engage in contracting business. In March of the following year Mr. Delo returned to railway service as division engineer of the Chicago Great Western. From July, 1905, to September, 1908, he was engineer of maintenance of way of the Chicago & Alton at Kansas City, Mo., and Bloomington, Ill. He then went to the Chicago Great Western for three months as division engineer at Des Moines, leaving that road in December, 1908, to become engineer maintenance of way of the National Railways of Mexico at the City of Mexico. In March, 1910, he again returned to the Chicago Great Western as engineer maintenance of way, from which position he is now promoted to that of chief engineer, as above noted.

Photo by Matzene, Chicago
C. G. Delo

C. P. Lloyd has been appointed superintendent of water service of the St. Louis & San Francisco, with headquarters at Springfield, Mo.

R. P. Graham, transitman in the office of the engineer of maintenance of way of the Pennsylvania Railroad, at Philadelphia, Pa., has been promoted to assistant supervisor of the Conemaugh division, with office at Freeport.

W. W. Hubley, assistant supervisor of the Pennsylvania Railroad at Altoona, Pa., has been appointed supervisor of division No. 26, with office at Columbia, Pa., succeeding H. E. Bertolet, resigned, and R. L. Kell, assistant supervisor of the West Jersey & Seashore at Millville, N. J., succeeds Mr. Hubley.

Purchasing

F. Carter, auditor and assistant treasurer of the Chicago & Illinois Midland, has been appointed purchasing agent also, with headquarters at Chicago, succeeding H. E. Campbell.

C. D. Boice, who has been in the service of the Florida East Coast for some time, at the New York office, has been appointed purchasing agent, with headquarters at New York, succeeding L. C. Haines, promoted.

OBITUARY

W. L. Hall, general attorney of the Texas & Pacific, with headquarters at Dallas, Tex., died recently at the age of 67.

John M. Turner, formerly general manager of the Georgia & Florida, died suddenly on March 21, at Maxton, N. C.

J. J. Harding, formerly engineer of masonry construction on the Chicago, Milwaukee & St. Paul, at Chicago, died at Seattle, Wash., on February 28. He had been in the service of the St. Paul from 1895 to 1910.

J. W. Jacomb-Hood, M. I. C. E., of London, England, chief resident engineer of the London & Southwestern, died suddenly March 6 while riding horseback, alone, the cause of death being, presumably, heart disease. Mr. Jacomb-Hood was known to many Americans. He was born at Redhill in 1859. He was educated in engineering and did engineering work on the London & Southwestern at the age of 18. He had been chief resident engineer since 1901, and had had charge of many important improvements on the London & Southwestern, including the rebuilding of Waterloo station.

W. H. Underwood, assistant to passenger traffic manager of the New York Central Lines at Chicago, died in Chicago on Wednesday. He was born May 6, 1858, at Rochester, N. Y., and began railway work in 1874. He was a clerk in the office of the assistant general superintendent of the Michigan Central and clerk in the city ticket office of the Canada Southern at Detroit, Mich., until July, 1878, when he was made city passenger and ticket agent of the Wabash in that city. In April, 1883, he was appointed western passenger agent of the Michigan Central at Chicago, and four years later he became general eastern passenger agent at Buffalo, N. Y. He was promoted to assistant general passenger agent of the latter road in April, 1905, and in September, 1913, was appointed assistant to the passenger traffic manager of the New York Central Lines West at Chicago.

Thomas M. Connors, superintendent of the Hocking Valley, at Columbus, O., died at a hotel in Toledo on March 17. He was born on July 15, 1862, at Toronto, Ont., and was educated in Erie county, Pennsylvania, schools. In 1878 he began railway work as a telegraph operator on the Philadelphia & Erie, now a part of the Pennsylvania Railroad. He was then consecutively telegraph operator of the Standard Oil Company, the Cincinnati, Hamilton & Dayton Railroad and the Cleveland, Cincinnati, Chicago & St. Louis. From 1890 to 1891 he was train despatcher on the Cincinnati, Hamilton & Dayton, and then to 1903 was trainmaster on the Kanawha & Michigan. He was subsequently trainmaster on the Toledo & Ohio Central and the Hocking Valley. From 1906 to 1907 he was assistant superintendent of the Toledo & Ohio Central and then was superintendent of the Kanawha & Michigan until 1909, when he was appointed superintendent of the Hocking Valley.

Equipment and Supplies

LOCOMOTIVE BUILDING

The Ligonier Valley has ordered one American type locomotive from the Baldwin Locomotive Works.

The Death Valley Railroad, F. M. Smith, president, San Francisco, Cal., is in the market for motive power.

The Virginia & Southwestern has ordered 2 mikado type locomotives from the American Locomotive Company.

The Southern has ordered 5 mikado type and 2 8-wheel switching locomotives from the Baldwin Locomotive Works.

The Lehigh Valley Coal Company, New York, has ordered one 4-wheel switching locomotive from the Baldwin Locomotive Works.

The Inland Steel Company, Chicago Heights, Ill., and Indiana Harbor, Ind., has ordered 1 six-wheel switching locomotive from the American Locomotive Company. This locomotive will have 20 by 24 in. cylinders, 50 in. driving wheels, a total weight in working order of 126,000 lb., and a steam pressure of 180 lb.

CAR BUILDING

The Southern Pacific is in the market for passenger cars.

The Duluth, Missabe & Northern is in the market for 1,000 ore cars.

The Chicago & North Western is in the market for 2,000 40-ton box cars.

The St. Louis, Brownsville & Mexico is in the market for 600 or 700 freight cars.

The Death Valley Railroad, F. M. Smith, president, San Francisco, Cal., is in the market for rolling stock.

The St. Joseph Valley has ordered one 54-ft., 150 h. p., 40-passenger motor car from the Hall-Scott Motor Car Company.

The Virginian is said to have ordered 475 underframes from the Ralston Steel Car Company. This item has not been confirmed.

The Bryan & Central Texas has ordered two 100 h. p., 52 ft. 4 in., 72 passenger motor cars from the Hall-Scott Motor Car Company.

The Railway Supply Company, St. Louis, Mo., is in the market for 5 gondola, 40 tank, 10 box and 10 flat cars for export to Mexico.

The American Smelting & Refining Company is said to have ordered 60 ore cars from the Pressed Steel Car Company for export to Chili. This item has not been confirmed.

The Pittsburgh Railways have ordered 50 passenger cars from the Standard Steel Car Company, and 50 from the Pressed Steel Car Company. The trucks for these cars will be supplied by the Standard Steel Car Company.

The Bessemer & Lake Erie, previously reported as being in the market for 3,500 cars, is in the market for 1,500 hopper and 1,000 gondola cars. The remaining 1,000 cars are to be bought for the Duluth, Missabe & Northern.

The Pacific Great Eastern has ordered one 65-ft., 250 h. p., 52 passenger motor cars from the Hall-Scott Motor Car Company, and three trailer cars from the Canadian Car & Foundry Company, Ltd., for use with the motor cars.

The Atlantic Coast Line has ordered 200 underframes from the Cambria Steel Company. This road was reported in the *Railway Age Gazette* of last week as having ordered 15 passengers cars from the American Car & Foundry Company. The order included 6 70-ft. all-steel coaches, 4 all-steel combination mail and baggage cars with 40-ft. all-steel baggage compartments, and 5 60-ft. express cars. The Atlantic Coast Line is also reported to be in the market for 100 logging cars; but the last item has not been confirmed.

SIGNALING

The Baltimore & Ohio has ordered from the Union Switch & Signal Company the material for an electro-pneumatic interlocking plant at Green Springs, W. Va. The machine will have 35 working levers. The signals will be of the top-post type; 12 three-position and 8 two-position, all upper quadrant.

The Cincinnati, New Orleans & Texas Pacific (Queen & Crescent Route) announces that it has arranged to conduct a series of experiments to determine the value of automatic train stops. The first device to be tested will be the Julian automatic cab signal and train control, the test to take place at Ludlow, Ky., March 28.

The Alabama Great Southern announces that automatic block signals are to be installed on its line between Woodstock, Ala., and Milepost 37. The A. G. S. has already a large mileage of automatic signals, and, this work completed, the Queen & Crescent route will be operated under the automatic block signal system from Cincinnati, Ohio, to Meridian, Miss., 634 miles.

The Southern Railway is to install automatic block signals on its line between Knoxville, Tenn., and Morristown, 42 miles, double track. A new pole line is to be put up to carry the wires. Alternating current at 4,400 volts will be used, and light will be provided not only for the signals but for station buildings and switches. The main source of power will be at the company's shops at Knoxville.

The Cumberland Valley has ordered from the Union Switch & Signal Company material for an all-electric interlocking plant at Chambersburg, Pa. The machine will be type S. This part of the road is equipped with block signals controlled by alternating current apparatus and the necessary changes will be made in the automatic system. The interlocking machine will have 17 levers and 7 spare spaces. Electrical energy at 110 volts d. c. will be used for operating the interlocking switches and signals, while the automatic signals will be operated on 55 volts, 25 cycles. Alternating current track circuits will be employed through the interlocking, and the indication of the various functions of the plant will also be controlled by alternating currents.

English Railway Orders Locomotive from Germany.—The South-Eastern & Chatham Railway of England has recently placed an order for 10 locomotives with the German firm of A. Borsig, having works at Tegel, near Berlin. English producers have been very much put out because the order was not placed in England, and it is reported that several English firms, including one which had had business with the company in the past, were not even asked to quote prices. These locomotives are to be used on the South-Eastern's continental boat express traffic, and are to be delivered in May in time for the summer travel. This would require a delivery in something like 16 weeks, and it is explained that no English locomotive builder would have been able to produce them in less than 12 months, the reason being that all of the builders were working at high pressure. The company is careful to make the statement that quick delivery is the only important consideration. It was not thought that the German locomotives would be found superior to the British locomotives, and it is said, also, that the German price is not lower. The railway possesses some 700 engines. It has bought rolling stock from foreign countries on only one occasion, and that was 20 years ago when some equipment was bought from America. The locomotives are to be built according to the company's designs and under the supervision of one of its representatives.

An Indian Station Agent's Telegram.—The railway authorities of India have found some dfficulty in their efforts to train their staff to a proper appreciation of what is, or is not suitable for a telegram. A short time ago, one of the district officers received the following urgent message from one of his Indian station masters: "Assistant eloped with wife. My God, what a pity!"

Supply Trade News

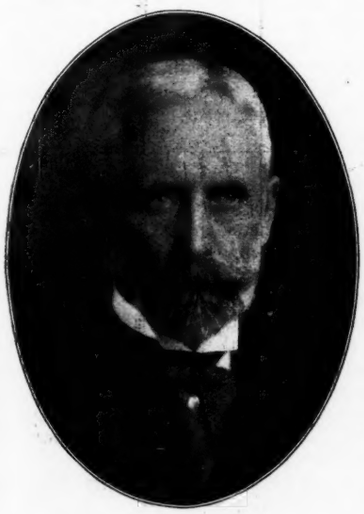
D. R. Morris has resigned as signal engineer of the El Paso & Southwestern, to go with the Federal Signal Company.

George Hills has resigned as president of the Welding Materials Company, New York, to become general sales agent of the Siemund Wenzel Electric Welding Company, also of New York.

The White Enamel Refrigerator Company, St. Paul, Minn., has received a contract from the Great Northern for Bohn collapsible tanks and Flaxlinum insulation for 75 express refrigerator cars.

The Permanent Manufacturers' Exhibit of Railway Appliances and Equipment now located on the twelfth floor of the Karpen building, Chicago, will be discontinued on March 31; and the exhibit will be removed to the ninth floor of the Lytton building, Jackson and State streets. The exhibit will be in charge of A. Sheldon as manager, as before.

Colonel Henry Goslee Prout, whose election as president of the Union Switch & Signal Company was announced in these columns last week, is well known to the readers of the *Railway Age Gazette*. Colonel Prout was editor of the *Railroad Gazette* from 1887 to 1903, when he resigned to accept George Westinghouse's invitation to become vice-president and general manager of the Union Switch & Signal Company. At that time Mr. Westinghouse himself was president of the company and remained so until his death; but he did not devote much time to it, and Colonel Prout was the active head. As such he has had the responsibility incident to conducting the Union Switch & Signal Company through the most productive decade of the science of signaling. Under his management the company has grown from a corporation with $2,500,000 stock and net income of about $300,000 to a corporation with $10,000,000 stock authorized and close to $7,000,000 issued, and net income for 1913 of $1,618,000. The regular dividends of the company have exceeded 12 per cent. for several years. Colonel Prout's notable qualities as an editor were his sound scholarship, extraordinarily broad outlook on the science of his own profession—civil engineering and fearless integrity, combined with quite unusual literary ability. The qualities which influenced Mr. Westinghouse in his selection of Colonel Prout as active head of the Union Switch & Signal Company were probably his executive ability, his gift of diplomacy, and his broad acquaintance among railroad men and broad knowledge of railroad problems, as well as his specific knowledge of the art of signaling. Mr. Prout had so interesting and memorable a career before he became an editor and then manager of a large, successful business that many of his older friends, even after the lapse of 26 years, think first of his achievements in other than business life. Prout came of old New England stock. His early education was scanty. He enlisted in 1863 in a Massachusetts regiment and, as a member of the Army of the Potomac, went through the Wilderness campaign, the operations that led to the investment of Petersburg and the pursuit of Lee. Mustered out in 1865, he worked for two years and then went to the University of Michigan, taking the degree of civil engineer. In 1902 he received an honorary degree of Master of Arts from Yale, and in 1911 an honorary degree of Doctor of Laws from Michigan. Two of his summer vacations while he was in college he spent with the Survey of the Great Lakes and left the university in the middle of his senior year to engage in engineering work. He had a few years of work in railroad surveying and did work for the Engineer Bureau of the War Department. The opportunity offering, he went to Egypt as a major of engineers in the army of the Khedive. His first year in Africa was spent in the delta and on the Asiatic frontier. He had an independent command and engaged in geodetic and topographical engineering, studies for a hospital and a military prison, and repairs of fortifications and the administration of the Engineer Bureau at the war office. He then went to the Soudan in command of an expedition to Kordofan and Darfour, and later to the head of the Nile as governor general of the Provinces of the Equator, succeeding General "Chinese" Gordon, who became his superior officer at Khartoum as governor general of the Soudan. Colonel Prout, however, was situated at Lado, 1,010 miles south of Khartoum, and was therefore placed entirely on his own responsibilities. He had 3,000 men under him, scattered over a vast territory, and but one European or American officer. More recent developments make it interesting to note that he recommended the building of a railroad from Suakim, on the Red Sea, to Berber, on the Nile, a line which has since been built and which had it been built soon enough would have prevented the siege of Khartoum and the tragedy of Gordon's death. These adventures in international politics, with the resulting broad acquaintance in Europe, made Colonel Prout a world citizen. In his life are combined the work of a scholar, a soldier and a successful business man.



H. G. Prout

Sidney G. Johnson, general sales manager of the Union Switch & Signal Company, who has been appointed vice-president in charge of sales and engineering of the company, with office at New York, was born in Eccles, Lancashire, Eng., in 1874, and entered Harrowgate boarding school when he was about nine years old. At the age of twelve he came to America and went to Swissvale where his father, Henry Johnson, was works manager of the Union Switch & Signal Company. After about a year he went to Rahway, N. J., where the Johnson Railroad Signal Company had been established, and during vacations he worked in the shops and drawing office to acquire a knowledge of the business. He attended a New York preparatory school and for two years after leaving school he worked in the construction gang of the Johnson Signal Company, without pay, in order to learn the business. He tutored with the intention of going to the Sheffield Scientific School, Yale University, but owing to the difficulties encountered by the Johnson Railroad Signal Company he was unable to attend the university, and he went into the construction forces of the Union Switch & Signal Company for a year. He was then about 20 years old. In 1896 the Standard Railway Signal Company was organized and Mr. Johnson's father was made president. Mr. Johnson was made signal engineer and had charge of the locking and dog sheets, making estimates, etc. When the company moved to Troy, Mr. Johnson went with it, but after the Trojan Car Coupler Company's interests took hold Mr. Johnson's father left the Standard and Mr. Johnson followed him after a few months, and went to the Union Switch & Signal Company in 1899 in the New York office. Shortly thereafter he was made engineer of construction for the eastern district, reporting to Mr. Goodman, general manager. Afterwards he

Photo by Matzene, Chicago.

S. G. Johnson

was for two years at Swissvale as signal engineer in charge of the estimating department, and then went back to New York and had charge of installing the signal system on the Interborough and all the large installations put in at that time. When the Interborough job was finished he was made eastern manager in charge of sales and construction. About four years ago he was made general sales manager.

W. D. Uptegraff has been made vice-president of the Union Switch & Signal Company in charge of finance. J. H. Johnson has been appointed secretary and treasurer of the same company.

Henry R. Kent has formed a partnership with Carl M. Vail to do a general engineering business under the firm name of Henry R. Kent & Company. The new company will have offices at 141 Broadway, New York.

The Barco Brass and Joint Company, Chicago, has recently made an addition to its facilities by purchasing a four-story and basement building and grounds at 212 West Illinois street, Chicago, 125 x 100 ft. Clarence L. Mellor, formerly in charge of western sales for the United States Metallic Packing Company, has been appointed western representative of the company. Mr. Mellor has been in the railway supply business for a number of years. From 1897 to 1899, he was in the London office of Edward Mahoney, and also represented the Baldwin Locomotive Works, Harlan & Hollingsworth, and the Edgemore Bridge Works. In 1899 he returned to the United States as foreman in various departments of the Baldwin Locomotive Works, and in 1909 he became chief inspector for Alfred Lovell. After a few months he became connected with the United States Metallic Packing Company.

American Locomotive Company

The executive committee of the American Locomotive Company on March 26, 1913, appointed John W. Griggs, Thomas Thacher and Albert H. Wiggin a committee to examine the charges made by Isaac M. Cate against the management of the company. The committee in its turn employed John Havron as an expert to make an independent examination. The report of the committee is dated February 16, 1914. It finds that the charges made are untrue, but it also makes certain recommendations.

The most serious charge was that officers of the company were wrongfully influenced in making purchases from certain other companies in which they were interested to the detriment of the Locomotive Company. The committee cannot find that the interest of W. H. Marshall, the president, or of other officers in other companies has worked detriment to the American Locomotive Company. Thus, Mr. Marshall was at one time a director of the Railway Steel-Spring Company and owned 10 shares of its stock. The Spring Company in 1912 supplied 80.8 per cent. of the springs used by the Locomotive Company, but half of these were specified by the railroads. The committee finds that the prices paid for springs are reasonable and that the contracts "seem to have been advantageous to the Locomotive Company." The fact that the Locomotive Company does not make its own springs does not indicate "the influence of any improper motives in the company's dealings with the Spring Company." Similar opinions are expressed in reference to tires supplied. The committee also discussed in lesser detail the dealings with several other companies, but finds no ground for charges of wrongdoing in any case.

The committee examined the Locomotive Company's venture into the automobile business. "We do not find that the failure of this enterprise was due to any dereliction on the part of the general officers of the company."

No grounds are found for the hint that officers of the company profited by the sale of its steam shovel business to the Bucyrus Company.

As to charges that the company pays too much for scrap iron, the committee says: "We find . . . that the Locomotive Company purchases its pig iron and its scrap at very favorable prices."

In reference to a criticism that the company should not have given up its Cole superheater patents to the Locomotive Superheater Company, the report says: "It was deemed a matter of good judgment by the directors of the Locomotive Company to assign its patents to the superheater Company. . . . In view of the facts known at the time . . the transaction was a wise and prudent one, and nothing has occurred . . . since to indicate that the Locomotive Company is not better off now than it would have been had it continued solely under the Cole patent, engaging in the consequent patent litigation that would have ensued, and suffering the unavoidable delay that would have been encountered in getting its invention established in use."

The summary of the committee's findings and recommendations is as follows:

No evidence is found of corrupt practice on the part of the company's officers.

"We find that the affairs of the company have not heretofore been so frequently and carefully supervised and regulated by the board of directors as good business requires." It is stated in the report that this has since been remedied.

"We recommend that the executive committee, in connection with the officers, give careful consideration to the methods of purchase and sale of scrap, and ascertain if any system can be put in practice more satisfactory than that heretofore followed.

"We find that the connection of officers and directors of this company with the directorates of other companies has not resulted in any injury to the Locomotive Company. But in view of the present sensitiveness of the public mind on this subject, and because such relations give rise to unfounded suspicions, we are of the opinion and recommend that no officer of this company serve as director or officer of any other company with which it has dealings.

"We find that the fact that different relatives of one or more officers of the Locomotive Company are connected in some official capacity with concerns that do business with this company furnishes no reason to impute any undue partiality toward such companies in dealings between them and the Locomotive Company. We recommend, however, that in dealing with such companies especial care and scrutiny be observed to see that the Locomotive Company receives fair treatment, and that no undue favor or partiality is extended.

"We recommend careful consideration of these questions:

"Whether savings may be made by manufacturing instead of purchasing springs, tires, castings, bolts or other articles now purchased by the company from others, and in this connection, whether the company, by efforts to change specifications of the railroad company, may secure the right to make its own staybolts instead of purchasing Tait bolts.

"Whether springs or tires can be purchased at lower prices with equal advantage by any method other than that which has been followed.

"Whether salaries can be reduced without loss of efficiency.

"Whether general expenses can be reduced, and in this connection, whether it would be wise to transfer the general offices, in whole or in part, to one or more of the plants."

The report is concurred in by an advisory committee consisting of W. R. Willcox and L. C. Seelye.

TRADE PUBLICATIONS

METAL TIES.—The Sanford Metal Railroad Tie Company, Elizabeth, N. J., has issued a catalog describing the recently patented Sanford metal tie and anchor.

BALL BEARINGS.—The S. K. F. Ball Bearing Company, New York, has recently issued a special catalog dealing with its ball bearings for railway lighting generators.

MALLEABLE CASTINGS.—The National Malleable Casting Company, Cleveland, Ohio, has recently issued circular No. 65, describing the National safety brake lever; circular No. 66 describing the National safety clevis and pin for uncoupling rods, and circular No. 51 describing National rail braces and tie plates.

BANGOR & AROOSTOOK.—This road has recently issued the 1914 edition of "In the Maine Woods." The booklet has over 100 pages of reading matter, and is profusely illustrated. As usual it contains several stories of hunting in the Maine woods with such chapter heads as: Canoeing Through Forest Waterways; a Short Story of a Lengthy Canoe Trip; Aroostook's Angling Allurements, and the Blind Trout of Kidney Pond, etc. It also contains hints to the hunter under such heads as: the Game Laws in Brief; Where to Get Hunters' Licenses; the Expense of a Woods Vacation, etc. There are also chapters dealing with the county of Aroostook through which the road runs. The booklet is in every way up to the standards of previous years.

Railway Construction

BLACK MOUNTAIN & EASTERN.—Work will be finished soon, it is said, on an 18-mile section of this line out of Combs, Ark. Burke & McNerney, Fort Smith, Ark., are the contractors.

CORNWALL & HAWKESBURY.—Application has been made at Ottawa, Ont., for incorporation by this company to build from Cornwall, Ont., northeasterly through Stormont county to Martintown, thence to Alexandria and northerly through Glengarry and Prescott counties to Hawkesbury, thence to a point on the Canadian Pacific near Greenville or Calumet, about 50 miles. The names of the promoters are not given.

CUMMING & NORCROSS.—Incorporated in Georgia with $250,000 capital to build a 22-mile line from Cumming, Ga., south to Norcross. The names of the incorporators are not given.

GULF, FREEPORT & NORTHERN.—This company, which started work last year on a line from Freeport, Tex., northwest, has grading work finished on 16 miles in Fort Bend and Brazoria counties, and the right of way has been secured except on the section between Columbia and Freeport. The company is carrying out the construction work with its own forces and expects to have about 60 miles finished during 1914. C. L. Sharp, vice-president and general manager; T. E. Clark, treasurer, Freeport. (October 3, p. 637.)

MISSISSIPPI ELECTRIC OF COLUMBUS.—Incorporated in Mississippi with $1,000,000 capital, to build from Okolona, Miss., southeast to Aliceville, Ala., about 80 miles. The incorporators inclued C. F. Sherrod, B. Bell and T. B. McCrary, all of Columbus, Miss.

NEW YORK SUBWAYS.—Bids are wanted on April 14, by the New York Public Service Commission, First district, for a section of the Whitehall-Montague street line, mainly through Whitehall street in the borough of Manhattan. Bids are wanted on April 17, for a section of the Seventh avenue line from Vesey street south through Greenwich street to the Battery. The commission will advertise for bids in a few weeks for two new tunnels under the East river. One is to run from Whitehall street, Manhattan, to Montague street, in the borough of Brooklyn, and the other is to run from Old Slip, Manhattan, to Clark street, Brooklyn.

OKLAHOMA, NEW MEXICO & PACIFIC.—An officer is quoted as saying that work will be started in the near future on an extension from Ringling, Okla., north to Oklahoma City. The company started work last year on a line from Ardmore, Okla., west via Wilson to Ringling, and will later extend the line west to Lawton. The section from Ardmore to a point 8 miles west of Wilson, 28 miles, is now in operation. (January 23, p. 210.)

PACIFIC GREAT EASTERN.—Contracts were recently let to build the Kelly Lake-Fort George 100 mile section south from Fort George, B. C., it is said, as follows: To H. E. Carelton & Co., the first 25 miles; A. Griffin & Co., the next 25 miles, and to Burns, Jordan & Company, the remaining 50 miles. The line is being built from Vancouver, B. C., north to the Grand Trunk Pacific at Fort George, about 350 miles, and extensions are projected north from Fort George. (March 20, p. 704.)

PENNSYLVANIA SYSTEM.—The record of the mileage of the road on December 31, 1913, shows that the total length of main line on the lines east of Pittsburgh, Pa., and Erie is 5,349 miles, with 1,907 miles of second track, 561 miles of third track, 482 miles of fourth track and 4,690 miles of company's sidings, a total of 12,989 miles. There was an increase during the year of 16 miles of first track, 18 miles of second track, 10 miles of third track and 103 miles of sidings, a total increase of 147 miles. On the Pennsylvania lines west of Pittsburgh and Erie the mileage is 3,097 miles of first track, 1,372 miles of second track, 221 miles of third track, 130 miles of fourth track, and 2,632 miles of sidings, a total of 7,452 miles. During the year there was an increase of 26 miles of second track, 5 miles of third track and 55 miles of sidings, and a decrease of 6 miles of first track, making a total increase of 80 miles. The mileage of the Vandalia Railroad is: First track 852 miles, second track, 61 miles, third track, 8 miles, and sidings, 436 miles, a total of 1,357 miles. The grand total of all lines, including those operated by and associated in interest with the Pennsylvania Railroad is 11,730 miles of first track, 3,718 miles of second track, 822 miles of third track, 630 miles of fourth track and 9,298 miles of sidings, a total of 26,198 miles. Of this, 6,427 miles of first track are east and 5,303 miles are west of Pittsburgh and Erie.

SEATTLE, PORT ANGELES & LAKE CRESCENT.—The Erickson Construction Company, which has the general contract to build this line east and west from Port Angeles, Wash., about 76 miles, has sublet the track laying and bridge work to the Guthrie-McDougal Company, Portland, Ore. C. J. Erickson, president, Seattle, and C. P. Donovan, chief engineer, Port Angeles. (December 5, p. 1099.)

TAMPA & GULF COAST.—This company, which is building an extension along the west coast of Florida, via Port Richey, Tarpon Springs, and Clearwater to St. Petersburgh, has opened for passenger traffic, the first section of the extension to Green Springs. It is expected that the line will be open for operation to Clearwater next month. (March 6, p. 493.)

UTAH LIGHT & RAILWAY.—An officer writes that the company will build the proposed extension this year with its own forces from Centerville, Utah, north to Farmington, 5 miles. The work includes putting up a steel bridge. (March 13, p. 556.)

UVALDE & NORTHERN.—Incorporated in Texas with $60,000 capital and headquarters at Barksdale, Tex., to build from Uvalde, north to a point at or near the headwaters of Camp Wood creek, in Real county, formerly Edwards county, about 55 miles. A contract for the construction work has been let to L. J. Smith, Kansas City, Mo., and the work will be started at once. The company expects to have the line in operation in about six months, and eventually to build an extension to San Angelo. The incorporators include L. J. Smith and E. H. McVey, Kansas City, Mo.; L. J. Wardlow, Sonora, Tex.; F. C. Adams, W. A. Morriss, W. F. Brice, J. J. Ford, S. P. Skinner and S. Turner, San Antonio; and R. C. Walker, Austin.

WATAUGA & YADKIN RIVER.—An officer of this company, which now operates 22 miles of road from North Wilkesboro, N. C., west via Elkville Junction to Grandin, writes that track has been laid on 1.5 miles west of Elkville Junction, and grading has been completed to Darby on the extension via Boone to Butler, Tenn., on the Virginia & Southwestern. A branch is projected northeast from a point east of Boone, following the south fork of the New river to a point beyond Todd, and surveys were started some time ago for an extension from Grandin southwest to Lenoir, 16 miles. It has not yet been determined when contracts for the extensions will be let. On 16 miles the approximate cut and fill work involves handling 80,000 cu. yds. to the mile. The maximum grades will be 2.5 per cent. compensated and the maximum curvature 10 deg. There will be 20 trestles to have a total length of 5,000 ft., and three tunnels to have a total length of 950 ft. The company expects to develop a traffic in lumber, mica, iron ore and farm products. W. J. Grandin, president, and H. C. Landon, chief engineer, North Wilkesboro. (December 5, p. 1100.)

RAILWAY STRUCTURES

CHARLESTON, W. VA.—An officer of the Charleston Interurban writes that the company is making plans to build a steel viaduct over the Kanawha river to cost about $200,000. It has not yet been decided when bids will be asked for the work. S. M. Gallaher, superintendent, Charleston.

SAN ANTONIO, TEX.—The San Antonio Belt & Terminal Company has announced plans for the erection of a new passenger station to cost $125,000, and a new freight depot to cost about $40,000, together with improvements in connection with the new buildings which will bring the total expenditure up to over $1,000,000.

TACOMA, WASH.—The Oregon-Washington Railroad & Navigation Company has let a contract to the Missouri Valley Bridge Company, Leavenworth, Kan., for the erection of a bridge across the city waterway at Fifteenth street.

Railway Financial News

BOSTON & ALBANY.—J. P. Morgan & Co., New York, have bought from the company and resold $2,128,000 Boston & Albany equipment trust 4½ per cent. notes of 1912. This is the unsold balance of the $7,500,000 authorized in 1912.

BUFFALO, ROCHESTER & PITTSBURGH.—The New York Public Service Commission, Second district, has approved an issue of $1,052,000 consolidated mortgage 4½ per cent. bonds. When these bonds are issued there will be a total outstanding of $8,364,000 consolidated 4½'s. The proceeds from the sale of the bonds now authorized are to be used to reimburse the company for expenditures for additions and betterments.

BUTTE, ANACONDA & PACIFIC.—The Guaranty Trust Company, New York, and Kidder, Peabody & Co., Boston, Mass., have bought from the company and are offering $3,000,000 first mortgage sinking fund 5 per cent. bonds of February 1, 1914-1944. These bonds are being offered to the public at 99¾. They are the total outstanding issue of an authorized issue of $5,000,000. The bonds are secured by a first mortgage on 136 miles of line of the Butte, Anaconda & Pacific and all other property except steam locomotives, and are guaranteed principal and interest by the Anaconda Copper Mining Company.

COLORADO & SOUTHERN.—Directors have decided to pass the semi-annual dividend on the first and second preferred stock. There is outstanding $8,500,000 of each class of preferred, both classes being entitled to 4 per cent. non-cumulative dividends. The first preferred has paid 4 per cent. annually since 1905, and the second preferred since 1907.

MISSOURI, KANSAS & TEXAS.—The formal consolidation of the Wichita Falls, the Wichita Falls & Southern, the Wichita Falls & Northwestern and the Wichita Falls & Wellington with the Missouri, Kansas & Texas will take place on April 4 in accordance with the agreement between the Texas authorities and the Katy previously described in these columns.

NEW YORK, NEW HAVEN & HARTFORD.—The directors have concluded an agreement, subject to ratification by the stockholders, with the Department of Justice and have adopted a plan for the sale of certain holdings of the New York, New Haven & Hartford. The following is the announcement made by the Department of Justice:

"The attorney-general has indicated to the representatives of the New York, New Haven & Hartford the arrangements which he thinks would result in bringing the affairs of that company into harmony with law. The representatives of the railroad are willing to accept the requirements indicated and to endeavor to put them into effect without delay if approved by the stockholders in a meeting to be called at once.

"The indicated arrangements, stated in general terms, follow:

"First The Boston Railroad Holding Company is a Massachusetts corporation holding a majority of the stock of the Boston & Maine Railroad, and 90 per cent. of the former's stock in turn is owned by the New Haven railroad. The charter of the holding company prohibits it from disposing of the Boston & Maine stock. The legislature of Massachusetts will be asked to remove this prohibition, and if this is done the stock of the holding company will be transferred at once to five trustees, and, after arrangements have been made to protect the minority stock of the holding company, they shall sell the Boston & Maine stock prior to January 1, 1917.

"Second. The stocks of the companies which control the Connecticut and Rhode Island trolleys will be placed in the hands of trustees—five for each State—and shall be sold within five years from July 1, 1914.

"Third. The majority stock of the Merchants & Miners Transportation Company, now held by the New Haven, will be placed in the hands of three trustees and shall be sold within three years from July 1, 1914.

"Fourth. The minority stock in the Eastern Steamship Corporation, held by the New Haven, shall be sold within three years from July 1, 1914, and in the meantime shall be deprived of voting power.

"Fifth. Whether the New Haven railroad shall be permitted to retain the sound lines will be submitted to the Interstate Commerce Commission for determination under the provisions of the Panama Canal act.

"Sixth. The Berkshire trolleys shall be sold within five years from July 1, 1914.

"Seventh. A decree embodying the foregoing shall be entered in the United States district court for the Southern district of New York. The decree shall further provide that upon application of the New Haven railroad or the trustees, and for good cause shown, the time within which any of the above-mentioned stocks shall be sold may be extended by the court.

"The essential reason for placing the properties in the hands of trustees is to secure their immediate independent managements.

"The outlines of the proposed decree and trust agreements have been discussed and are understood. Their verbiage remains to be worked out, but no difficulty is anticipated in that respect.

"This statement has the approval of both the attorney-general and the representatives of the railroad."

Chairman Elliott of the New Haven system gave out this statement:

"In regard to the arrangement with the Department of Justice, in the judgment of the directors the general business and financial conditions in New England, and particularly those affecting the transportation lines, were such that it seemed wiser to make a settlement, if possible, rather than face a general dissolution suit with all its ramifications and uncertainties.

"New England needs peace and a chance for constructive work. If that condition could be obtained by an amicable adjustment under which ample time was allowed for the protection of the company's property the directors felt that such adjustment would be helpful to New England and to the stockholders of the company.

"The directors feel that the time allowed with the right in the court to extend it upon application of the company or of the liquidators gives an opportunity for disposing of the various properties to the best advantage possible and with the least disturbance to general business conditions."

Mr. Elliott said further that he and the lawyers had urged upon the Department the great importance of ample time and of good trustees, and that the Department had met their views as to these two important points. He continued:

"The financial conditions confronting the company are most difficult, but it is hoped that this adjustment with the government increases the probability of handling the matter successfully, and this very vital question will be taken in hand by the directors at once.

"The directors have felt that the disposition of these properties was a transaction of such importance that the stockholders must pass upon it, to which the Department has assented.

"A meeting will be called in the very near future for that purpose. Prior to that meeting a statement will be submitted to each stockholder outlining the situation.

"Business, particularly that of transportation in New England, needs help and co-operation from the people, governmental agencies, State and national, the press and a chance to go ahead.

"It is to be hoped that this adjustment with the government will prove to be an important and desirable step in that direction."

The trustees who are to take the New York, New Haven & Hartford's holdings of Boston & Maine stock are Marcus P. Knowlton and James L. Doherty, both of Springfield, Mass.; James L. Richards and Charles P. Hall, both of Boston, Mass.; and Frank P. Carpenter, of Manchester, N. H.

PITTSBURGH, CINCINNATI, CHICAGO & ST. LOUIS.—A quarterly dividend of ¾ per cent. on the preferred has been declared. This reduces the annual rate from 5 per cent. on the common to 3 per cent., and from 5 per cent. on the preferred to 4 per cent.

ST. LOUIS SOUTHWESTERN.—The Guaranty Trust Company of New York has bought from the company and resold $1,700,000 equipment trust 5 per cent. bonds, dated April 1, 1914, maturing $85,000 semi-annually. Of the cost of the equipment securing these notes 10 per cent. was paid in cash.